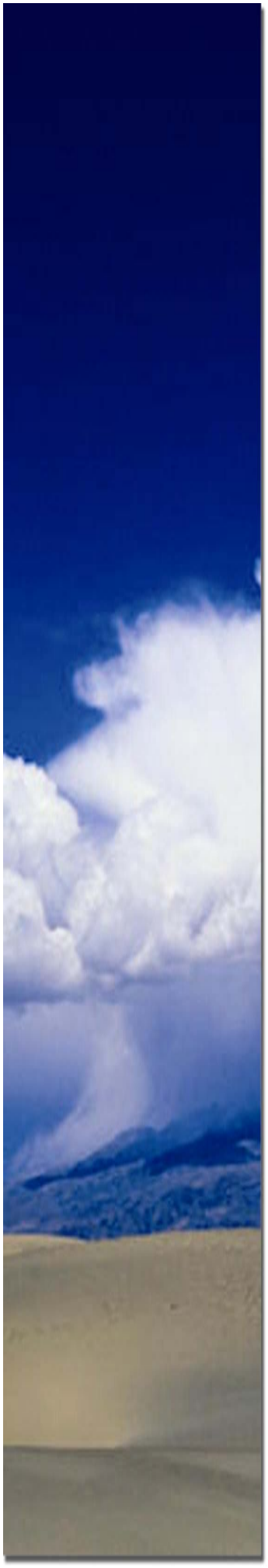

ENVIRONMENTAL ASSESSMENT

TARGET UPGRADES ON LEACH LAKE TACTICAL RANGE AT THE NATIONAL TRAINING CENTER, FORT IRWIN, CALIFORNIA

U.S. AIR FORCE

June 2006

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
JUN 2006		**00-00-2006 to 00-00-2006**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Environmental Assessment: Target Upgrades on Leach Lake Tactical Range at the National Training Center, Fort Irwin, California	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **ITS Corporation,650 E. Hospitality Lane Suite 450,San Bernardino,CA,92408**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**126**	

Environmental Assessment

Updating Targets on Leach Lake Tactical Range at the National Training Center, Fort Irwin, California

Prepared For:

U.S. Army Corps of Engineers
Fort Worth District

and

United States Air Force
Nellis AFB NV

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FINDING OF NO SIGNIFICANT IMPACT

1. Name of the Action

The name of this action is Environmental Assessment for Target Upgrades on Leach Lake Tactical Range at the National Training Center, Fort Irwin, California.

2. Description of the Proposed Action and Alternatives

The USAF at Nellis AFB, Nevada proposes to upgrade targets on Leach Lake Tactical Range to enhance realistic training for air liaison officers, forward air controllers-airborne, tactical air control parties, special tactics team members, and selected Army, Navy, and Marine Corps members. The realistic training includes tactics, techniques, and procedures in planning, requesting, coordinating, and controlling close air support at the tactical level. The Proposed Action will include reconfiguring and/or rebuilding current targets, building new targets, constructing a 500-foot fence on each side of the existing Owl Springs fence and gate, and installing installation boundary signs and range warning signs to improve range security and public safety.

No Action Alternative. Under the No Action Alternative, no changes would occur and the proposed target upgrade construction projects and fence/gate construction programmed on the Leach Lake Tactics Range would not proceed. Range clean up and target-rebuilding activities that are currently performed to support the Air Warrior mission would continue to be performed.

3. Summary of Environmental Resources and Impacts.

Implementation of the Proposed Action would have no significant impacts on air quality, biological resources, cultural resources, environmental justice, hazardous materials/waste, solid waste, noise, safety, socioeconomics, or water resources, and a beneficial impact to range security and public safety. There would be no significant impacts to human health and the natural environment.

4. Conclusion

Pursuant to the Council on Environmental Quality (CEQ) Regulations (40 CFR, Parts 1500 - 1500) implementing procedural provisions of the National Environmental Policy Act (NEPA) of 1969 (42 USC §4321, *et seq.*) and 32 CFR 989, which implements NEPA and CEQ procedures for Air Force actions, the United States Air Force at Nellis AFB has prepared this EA to explore and examine the potential environmental impacts for target upgrades on Leach Lake Tactical Range at the National Training Center, Fort Irwin, California. Based on the findings and conclusions of the EA, an Environmental Impact Statement (EIS) is not required.

Michael R. Scott

MICHAEL R. SCOTT
Colonel, USAF
Vice Commander, 99th Air Base Wing

15 June 06
Date

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Acronyms and Abbreviations

$\mu g/m^3$	micrograms per cubic meter
µm	micrometer
AAM	Annual Arithmetic Mean
AMSL	Above Mean Sea Level
AFI	Air Force Instruction
AFOSH	Air Force Occupational and Environmental Safety
AGL	Above Ground Level
AGM	Annual Geometric Mean
AGOS	Air Ground Operations School
AIRFA	American Indian Religious Freedom Act
BASH	Bird-Aircraft Strike Hazard
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resource Board
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CO	Carbon Monoxide
CRMP	Cultural Resources Management Plan
CTS	Combat Training Squadron
dB	Decibel
DA	Department of the Army
DoD	Department of Defense
DoDD	Department of Defense Directive
DPW	Directorate of Public Works
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act
F	Fahrenheit
FAA	Federal Aviation Administration
FICUN	Federal Interagency Committee on Urban Noise
FIP	Federal Implementation Plan
FONSI	Finding of No Significant Impacts
ft	Feet
H_2S	Hydrogen Sulfide
HAP	High Accident Potential
INRMP	Integrated Natural Resource Management Plan
ISA	Interservice Support Agreement
JCAS	Joint Close Air Support
JFC	Joint Firepower Course
JTAC	Joint Terminal Attack Controller
L	Sound Level
L_{dn}	Day-Night Average Sound Level

L_{max}	Maximum Sound Level
MDAQMD	Mojave Desert Air Quality Management District
MR_NMAP	MOA Range Noise MAP
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_2	Nitrogen Oxide
NOI	Notice of Intent
NO_X	Nitrogen Oxides
NRHP	National Register of Historic Places
NTC	National Training Center
NTTR	Nevada Test and Training Range
O_3	Ozone
OP	Operation Position
PM_{10}	Particulate Matter with an Aerodynamic Diameter of Less than 10 Microns
ppm	Parts Per Million
RANW	Range Wing
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
SEL	Sound Exposure Level
SIP	State Implementation Plan
SO_2	Sulfur Oxide
SWDA	Solid Waste Disposal Act
USAF	United States Air Force
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
UTM	Universal Transverse Mercator
UXO	Unexploded Ordnance
VOC	Volatile Organic Compounds
WTC	Weapons and Tactics Center

Executive Summary

Introduction

The United States Air Force (USAF) at Nellis AFB, Nevada has produced this Environmental Assessment (EA) to define, assess, and evaluate the potential environmental impacts of upgrading targets on the Leach Lake Tactical Range and to determine if an Environmental Impact Statement (EIS) is required.

Description of the Proposed Action and No Action Alternative

Proposed Action

The USAF at Nellis AFB, Nevada proposes to upgrade targets on Leach Lake Tactical Range to enhance realistic training for air liaison officers, forward air controllers-airborne, tactical air control parties, special tactics team members, and selected Army, Navy, and Marine Corps members. The realistic training includes tactics, techniques, and procedures in planning, requesting, coordinating, and controlling close air support at the tactical level. Upgrade actions would include reconfiguring and/or rebuilding current targets and building new targets. The USAF also proposes to construct a 500-foot long fence on each side of the existing Owl Springs fence and gate, and install installation boundary signs and range warning signs to improve security and public safety (Figure 1-1).

The Proposed Action proposes to implement some or all of the proposed target upgrade construction projects programmed on the Leach Lake Tactics Range as schedule and budget constraints allow (see Figures 2-1 thru 2-4). These projects include the following:

Area A – There are two locations for these areas. Both are stretches of existing roads where surplus military vehicles would be sited along the side of the roads to simulate military vehicle convoys, and periodically relocated—these areas would be defined as casual use areas. One is a 19,800-foot road (approximate) at the southwestern portion of the range (Target 66-34). The other is a 32,700-foot road (approximate) in the southeastern portion of the range (Target 66-36). The areas along side the roads are in predominantly undisturbed areas.

Area B – There are three locations for these sites. These sites would become locations for downed aircrew rescue for Joint Personnel Recovery Training—these areas would be defined as casual use areas. Each site would be composed of approximately .23 acres and an unbladed vehicle access trail (total of approximately .69 acres) (Targets 66-20, 66-21, and 66-22). All three sites are undisturbed areas.

Area C – There are two locations for these targets. These sites would become cave targets located on the north side of the valley up into the lower foothills. They both would be sited within undisturbed areas. Neither would have permanent, graded roads to the targets; however, a one-time (casual) use trail must be created from established roads in the valley floor on which construction equipment and materials would be transported (Targets 66-23 and 66-24). Both sites are undisturbed areas.

Area D – There are five locations for these targets. These targets would become armor/artillery positions that would also be used as simulated SCUD locations. These tar-

gets would all be located on the eastern half of the range. All except one would be constructed in undisturbed areas (Targets 66-25, 66-26, 66-27, 66-28, and 66-30).

Area E – There are two locations for these sites. Both would become tank ditches (Targets 66-03 and 66-06). Both sites are undisturbed areas.

Area F – There are two locations for these targets. Both arcs would be infantry trenches with obstacles and mortar positions (Targets 66-04 and 66-05). Both sites are undisturbed areas.

Area H – This target is an existing simulated airfield complex. New construction activities would include placing a mixture of assault helicopters and fixed-wing aircraft targets on the airfield and constructing earthen bunker complexes, simulated ammo storage facilities, camouflaged command and control facilities, and POL sites (Target 66-02). This target would be constructed in a disturbed area.

Area I – This target would depict an armored convoy made up of eight armored combat vehicles in a deployed configuration heading southeast. It is located to the west of and adjacent to Target Area J, and approximately ½ mile east of a major airfield, Target Area H. It would be located within the disturbed lakebed (Target 66-01).

Area J – This target would depict friendly troops in combat distributed throughout an approximate 185-acre area. It would be located mostly within the disturbed lakebed (Target 66-31).

Area K – This target is an existing simulated airfield complex. New construction activities would include building a simulated industrial/military complex on the northwest end of the area (Targets 66-32 and 66-33). This target would be constructed in an undisturbed area.

Area L – This area would be used as an Observation Point (OP). This area would be located on the top of a hill with an access road. Both the OP and road are in undisturbed areas.

Area M – This area would become a target antenna and single bunker. The area encompasses approximately 1 acre and an access road (Target 66-35). Both the target and access road would be constructed in undisturbed areas.

Area N – This area would be used as an Observation Point (OP). This area would be located on the top of a small hill with an access road. The area is undisturbed.

North Boundary Fence – The north entrance to the range has an old gate but no fence or warning signs. The new fence would extend approximately 500 feet on each side of the gate. The fence would be constructed in an undisturbed area without blading.

No Action Alternative

Under No Action Alternative, no changes would occur and the proposed target upgrade construction projects programmed on the Leach Lake Tactics Range would not proceed. Current target rebuilding and cleanup activities would continue to occur.

Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to provide target upgrades to better support U.S. and allied air and ground forces during advanced combat training conducted at the National Training Center (NTC), Fort Irwin, California. The USAF Air Ground Operations School (AGOS) at Nellis AFB, Nevada uses the Leach Lake Tactical Range to provide interservice training of Joint Firepower Course (JFC) students. The USAF would also rebuild the boundary fence at the north entrance of the range required to delineate the Army boundary from areas that allow public access.

The proposed changes are needed to improve the Leach Lake Tactical Range for future Joint Forces Command-Directed Joint National Training Capabilities exercise events. The reconstructed fence and warning signs are needed to enhance security and public safely.

Environmental Issues

The following environmental resources were considered relevant to the proposed action; they are all defined in Chapter 3 and analyzed for potential impacts in Chapter 4.

- Air Quality
- Biological Resources
- Cultural Resources
- Earth Resources
- Environmental Justice
- Hazardous Materials/Waste – Solid Waste
- Noise
- Safety
- Socioeconomics
- Water Resources

After a thorough evaluation of the above-mentioned environmental issues, the USAF at Nellis AFB, Nevada has concluded that no significant environmental impacts would occur as a result of implementing the Proposed Action. The following table shows a comparison of the Proposed Action and the No Action Alternative.

For an impacts summary of the alternatives, refer to Table 2-2.

Chapter 1 – Purpose and Need to Upgrade Targets on Leach Lake Tactical Range

1.1 Purpose and Need for the Proposed Action

The first purpose of the proposed action is to provide target upgrades to better support U.S. and allied air and ground forces during advanced combat training conducted at the National Training Center (NTC), Fort Irwin, California. The USAF Air Ground Operations School (AGOS) at Nellis AFB, Nevada uses the Leach Lake Tactical Range to provide interservice training of Joint Firepower Course (JFC) students. The second purpose of the proposed action is to re-build the boundary fence at the north entrance of the range and install warning signs.

The proposed changes are needed to improve the Leach Lake Tactical Range for future Joint Forces Command-Directed Joint National Training Capabilities exercise events. The reconstructed fence and warning signs are needed to enhance security and public safely.

1.2 Introduction

Leach Lake Tactical Range provides a tactical bombing range where U.S. and allied air-crews, under the control of mission ready Joint Terminal Attack Controller (JTAC) and JFC students, can train in the tactics, techniques, and procedures of Joint Close Air Support (JCAS).

United States Army National Training Center

The mission of the NTC is to provide realistic combat training for Army brigades to prepare them for combat operations on the modern battlefield. The NTC is the only instrumented training facility in the world that is suitable for force-on-force and live-fire training of heavy brigade-sized military forces. Each month the NTC provides 4,000 to 5,000 soldiers the essential training opportunities necessary to maintain and improve military readiness in support of our national security. The evolving sophistication of military equipment and advances in technology require a comprehensive battlefield that realistically simulates the tempo, range, and intensity of current and future conflicts. The NTC provides all the necessary combat and support components to conduct world-class combat training (Figure 1-1).

United States Air Force Air Warrior

An integral part of the NTC mission is the USAF Air Warrior mission. The 549th Combat Training Squadron (CTS), also known as Air Warrior, provides realistic combat training for flying units to prepare them for combat operations in support of friendly ground forces. Air Warrior operates in concert with the NTC to provide this training and is the primary user of the Leach Lake Tactics Range. Over 25 flying units participate in Air Warrior exercises each year and benefit from the world-class close air support training available at NTC and Leach Lake Tactics Range. This training not only benefits the air-crews, but also other exercise participants such as intelligence, weather, maintenance, and support personnel.

Stationed at Nellis AFB, Nevada, the 6th CTS is tasked to train air liaison officers, forward air controllers-airborne, tactical air control parties, special tactics team members, and selected Army, Navy, and Marine Corps members in the tactics, techniques, and procedures for planning, requesting, coordinating, and controlling close air support at the tactical level. Instruction includes lectures, seminars, and joint planning exercises covering areas such as service doctrine, mission and organization; command and control; tactical operations; and weapons systems training. The course finishes with a field training exercise integrated with Air Warrior and NTC operations at Fort Irwin.

1.3 Intent and Organization of this Environmental Assessment

The USAF at Nellis AFB has prepared this Environmental Assessment (EA) in accordance with the *National Environmental Policy Act (NEPA) of 1969* (42 USC 4321), 32 CFR 989, and the *Council on Environmental Quality (CEQ) Implementation Regulations* (40 CFR 1500-1508). It was prepared to define, evaluate, and assess the potential environmental impacts of upgrading targets on Leach Lake Tactical Range and to determine if an Environmental Impact Statement (EIS) is required. At the conclusion of the EA process, the USAF at Nellis AFB must determine if the proposed action would cause significant environmental impacts. If not, then a Finding of No Significant Impact (FONSI) will be prepared. If it is determined that the proposed action would cause significant environmental impacts, then the USAF would either abandon the project or release a Notice of Intent (NOI) to prepare an EIS. The NTC at Fort Irwin is a cooperating agency in preparing this document.

The EA is organized in the following manner:

- Chapter 1 – Purpose and Need. Chapter 1 discusses the purpose and need for upgrading targets on Leach Lake Tactical Range; an introduction to Air Warrior; the environmental impact analysis process; and the environmental issues evaluated in this analysis.

- Chapter 2 – Description of the Proposed Action and No Action Alternative. Chapter 2 describes the Proposed Action and the No Action Alternative.

- Chapter 3 – Affected Environment. Chapter 3 provides an overview of the baseline environmental conditions of the Leach Lake Tactical Range and the potentially affected environment.

- Chapter 4 – Environmental Impacts. Chapter 4 addresses the potential impacts of implementing the alternatives described in Chapter 2, when compared to baseline conditions presented in Chapter 3.

- Chapter 5 – Cumulative Impacts. Chapter 5 presents the cumulative impacts resulting from this project.

- Chapter 6 – Other Required Considerations. Chapter 6 presents the other required considerations i.e., the irreversible and irretrievable commitments of resources.

- Chapter 7 – List of Preparers. Chapter 7 presents the list of preparers involved in this document.

- Chapter 8 – Persons and Agencies Contacted. Chapter 8 presents the list of persons and agencies contacted in the process of preparing this report.
- Chapter 9 – Bibliography and References. Chapter 9 presents the references cited in this document.
- Chapter 10 – Glossary of Terms. Chapter 10 presents the definitions of the terms used in this report.
- Chapter 11 – Appendices

1.4 Environmental Issues

Environmental resource areas typically explored in environmental assessments often include land uses, recreational and visual resources, transportation, and hydrology and water resources. Land uses were not explored because this is not a land acquisition action—the proposed action would occur on previously withdrawn lands currently managed by the Army for military training; recreational and visual resources would remain unchanged as a result of this action; and transportation was not explored because this project does not propose any new, or changes to existing, ground transportation resources. During internal scoping, the above-mentioned environmental resources were examined but found to have no additional environmental effects. Therefore, these resource areas are not included in this document.

The following environmental resources were considered relevant to the proposed action; they are all defined in Chapter 3 and analyzed for potential impacts in Chapter 4.

- Air Quality
- Biological Resources
- Cultural Resources
- Earth Resources
- Environmental Justice
- Hazardous Materials/Waste – Solid Waste
- Noise
- Safety
- Socioeconomics
- Water Resources

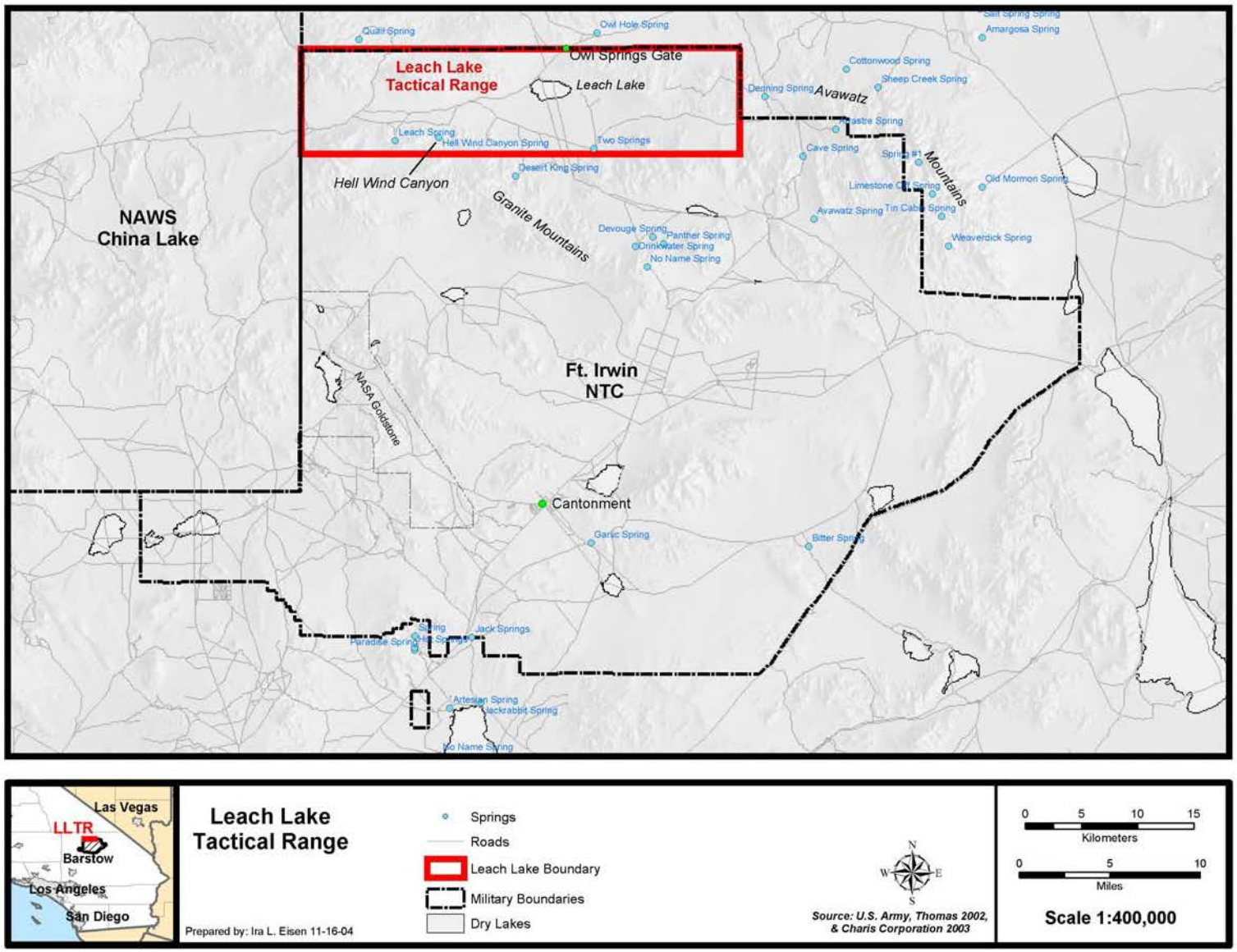

Figure 1-1: National Training Center

Chapter 2 – Description of the Proposed Action and No Action Alternative

2.1 Description of the Proposed Action

The USAF at Nellis AFB, Nevada proposes to upgrade targets on Leach Lake Tactical Range to enhance realistic training for air liaison officers, forward air controllers-airborne, tactical air control parties, special tactics team members, and selected Army, Navy, and Marine Corps members. The realistic training includes tactics, techniques, and procedures in planning, requesting, coordinating, and controlling close air support at the tactical level. The Proposed Action will include reconfiguring and/or rebuilding current targets and building new targets, and constructing a 500-foot long (estimated) fence on each side of the existing Owl Springs fence and gate, and installing installation boundary signs and range warning signs to improve range security and public safety. Except for the boundary fence and gate, the proposed action outlines all of the potential projects that would further enhance the realism of the targets for the Air Force's Close-Air Support mission at Leach Lake Tactics Range. More realistic targets provide better training opportunities and make the Range more consistent with the needs of realism relative to Joint National Training Capability's goals. Each individual project listed fills or enhances capabilities for the CAS mission and each individual action partially fulfils the purpose and need of the action. This suite of options would be implemented based Department of Defense (DoD) training needs and operational funding. As a result, the Air Force considers each individual action as an alternative and the analyses section in Chapter 4 reflect the cumulative impacts as though all of the actions would be implemented. Some or all of the actions may be implemented over the course of many years. The environmental impacts of each individual project or combination of projects would be a subset of the analyses provided in Chapter 4.

The following are descriptions of the proposed construction activities that could take place in each target area—for the purpose of this analysis, it is assumed that all proposed construction projects would take place (see Figures 2-1 thru 2-4):

Area A – These areas consist of placing surplus military vehicles along the side of the road (no more than 20 feet from the side of the road) to simulate military vehicle convoys. There are two stretches of road where these targets would be located and periodically relocated. One is a 19,800-foot road (approximate) at the southwestern portion of the range (approximately 18.2 acres) (Target 66-34). The other is a 32,700-foot road (approximate) in the southeastern portion of the range (approximately 30 acres) (Target 66-36). A maximum of 50 vehicles could be placed on each segment of road. The target vehicles would be hauled and/or towed to the target areas. The areas along side the roads are in predominantly undisturbed areas. No blading activities would be required; however, the locating and relocating of target vehicles would, over time, disturb the target areas. No live ordnance would be dropped on these targets.

Area B – Area B consists of three locations for the Joint Personnel Recovery Training Program for aircrew rescue training. These areas would be casual use areas and would not require any blading, construction, or major ground disturbing activities. Each site would be composed of approximately .23 acres and an

unbladed vehicle access trail (total of approximately .69 acres) (Targets 66-20, 66-21, and 66-22). All three sites are undisturbed areas.

Area C – Area C consists of two simulated cave target sites. Each cave target would be sized for simulated vehicle traffic, approximately 15 feet wide and 12 feet tall. There would be two simulated caves at each location. Construction would be either metal (two semi-truck sized storage containers) or concrete. The "two track" vehicle access trails to the sites would be unbladed and would only be used for construction and periodic maintenance—where possible, these trails would follow dried wash beds. The disturbed area would be approximately 400 feet by 100 feet at each site plus the vehicle access trails to each site. No live ordnance would be dropped on these targets (each site would be approximately 1 acre) (Targets 66-23 and 66-24). Both sites are undisturbed areas.

Area D – There are five locations for these targets. These sites would be used as armor/artillery positions and simulated SCUD locations. These targets would all be located in the middle to eastern half of the range. All except one would be constructed in undisturbed areas. The approximate size of each site would be 1,000 feet by 1,000 feet plus an unbladed vehicle access trail. These sites would require some blading for surface preparation. No live ordnance would be dropped on the three eastern sites (each site would be approximately 23 acres (total of approximately 115 acres)) (Targets 66-25, 66-26, 66-27, 66-28, and 66-30).

Area E – These sites consists of two tank ditch targets. Target E1 (66-03) is an area of approximately 2,000 feet by 100 feet, approximately 6 feet deep (approximately 4.6 acres); target E2 (66-06) is an area of approximately 1,000 feet by 100 feet, approximately 6 feet deep (approximately 2.3 acres). Both areas are in undisturbed areas.

Area F – These sites consists of two arc-shaped trenches to be used as infantry positions with obstacles and mortar positions located at Targets 66-04 and 66-05. The arcs would extend approximately 500 feet from existing targets and arc approximately a quarter circle (approximately 90 degrees) (approximately 5 acres each). The target areas would be within undisturbed areas.

Area H – This target is an existing simulated airfield complex. New construction activities would include placing a mixture of assault helicopters and fixed-wing aircraft targets on the airfield and constructing earthen bunker complexes, simulated ammo storage facilities, camouflaged command and control facilities, and POL sites (approximately 60 acres). Vertical targets would be built using a mixture of empty sea-land containers, and wood and/or composite structures. Several movable (time critical) targets would be placed inside the target complex, interspersed with personnel figures (Target 66-02). This target would be constructed in a disturbed area.

Area I – This target would depict an armored convoy made up of eight armored combat vehicles in a deployed configuration heading southeast. It is located to the west of and adjacent to Target Area J, and approximately ½ mile east of a major airfield, Target Area H (approximately 70.6 acres). It would be located within the disturbed lakebed (Target 66-01).

Area J – This target area would depict friendly troops-in-contact, distributed throughout an approximate 185-acre area located within the disturbed lakebed. Construction activities would include dispersing mock plywood troops and equipment throughout the target area. The mock-ups would be periodically moved (Target 66-31). NOTE: this target area was redesigned to exclude a large portion of its northeastern corner (approximately ¼ of the original target size) to avoid archeological site CA-SBR-571.

Area K – This target is an existing simulated airfield complex. New construction activities would include building a simulated industrial/military complex on the northwest end of the area (approximately 1,000 feet by 1,000 feet in an undisturbed area (approximately 23 acres)) (Target 66-32). Vertical targets would be built using a mixture of empty sea-land containers, and wood and/or composite structures. Construction would also include building earthen bunker complexes, simulated ammo storage facilities, camouflaged command and control facilities, and POL sites. Several movable (time critical) targets would be placed inside the target complex, interspersed with personnel figures.

Area L – Site L would be at the top of Hill 883 and would serve as an Observation Point (OP). The area would be accessed by a new road and have parking space for two vehicles—the new road would be approximately 720 feet long (approximately .2 acres) in an undisturbed area. The OP would be sited in an undisturbed, unimproved area, only large enough to place mobile radio transmitters—no blading of this area would be required (approximately 35.6 acres). This site is not a target and would not be authorized for live or inert ordnance.

Area M – This area would be used as an antenna and single bunker target. The area of new disturbance would encompass approximately 1 acre and an access road. Construction would require blading and building a simulated bunker. The site would be authorized for live ordnance; periodic maintenance would be required (Target 66-35).

Area N – Site N would be at the top of Chocolate Chip Hills and would serve as an OP. The area would be accessed by a new road on the southwest side of the hill—the new road would be approximately 830 feet long (approximately .22 acres) in an undisturbed area. The OP would be sited in an undisturbed, unimproved area, only large enough to place mobile radio transmitters—no blading of the OP area would be required (approximately 1.6 acres). This site is not a target and would not be authorized for live or inert ordnance.

North Boundary Fence – The north entrance to the range has an old gate but no fence or warning signs. The new fence would extend 500 feet on each side of the gate until it reaches mountainous terrain. Periodic maintenance may be required. Warning signs indicating that the area is a military reservation and public access is prohibited would be placed along the fence.

The construction crews and equipment are based out of the Nevada Test and Training Range (NTTR). Work during Coronet Clean rotations is based on crew availability and access times to the Leach Lake Tactical Range. The resulting schedule would limit the construction activities to 2, 14-day periods, of which only 24, 10-hour days would be worked. The annual activities include approximately 3 days for explosive ordnance

clearance, 3 days for target debris cleanup, 12 days of site grading, and 6 days for target construction.

Table 2-1: Target Correlation

TARGET AREA	NUMBERED TARGETS				
A	66-34	66-36			
B	66-20	66-21	66-22		
C	66-23	66-24			
D	66-25	66-26	66-27	66-28	66-30
E	66-03	66-06			
F	66-04	66-05			
H	66-02				
I	66-01				
J	66-31				
K	66-33				
M	66-35				

2.2 No Action Alternative

Under the No Action Alternative, no changes would occur and the proposed target upgrade construction projects and fence/gate construction programmed on the Leach Lake Tactics Range would not proceed. Range cleanup and target rebuilding activities that are currently performed to support the Air Warrior mission would continue to be performed.

2.3 Alternatives Considered but not Implemented

Constructing New Targets on the Nevada Test and Training Range (NTTR). The NTTR is a 2.79 million-acre bombing range located in southern Nevada, north of Las Vegas (Figure 2-5). The NTTR is used by Nellis AFB to support training and testing combat tactics, aircraft, their associated weapons systems, and all the activities that support those primary missions (USAF 1999). Constructing new targets on the NTTR for Air Warrior training, though feasible, would not meet the training requirements needed for close coordination with the Army activities on the NTC. The primary purpose of Air Warrior training is to provide both pilots and Army units the ability to train together in the manner they would in a wartime situation. The NTC is the only range where the Air Force and the Army can train side-by-side using live ordnance. Because of the unique and vital training opportunities that are available on the NTC (absent on the NTTR), which would greatly enhance the combat-readiness and safety of troops, this alternative was not carried forward for further consideration.

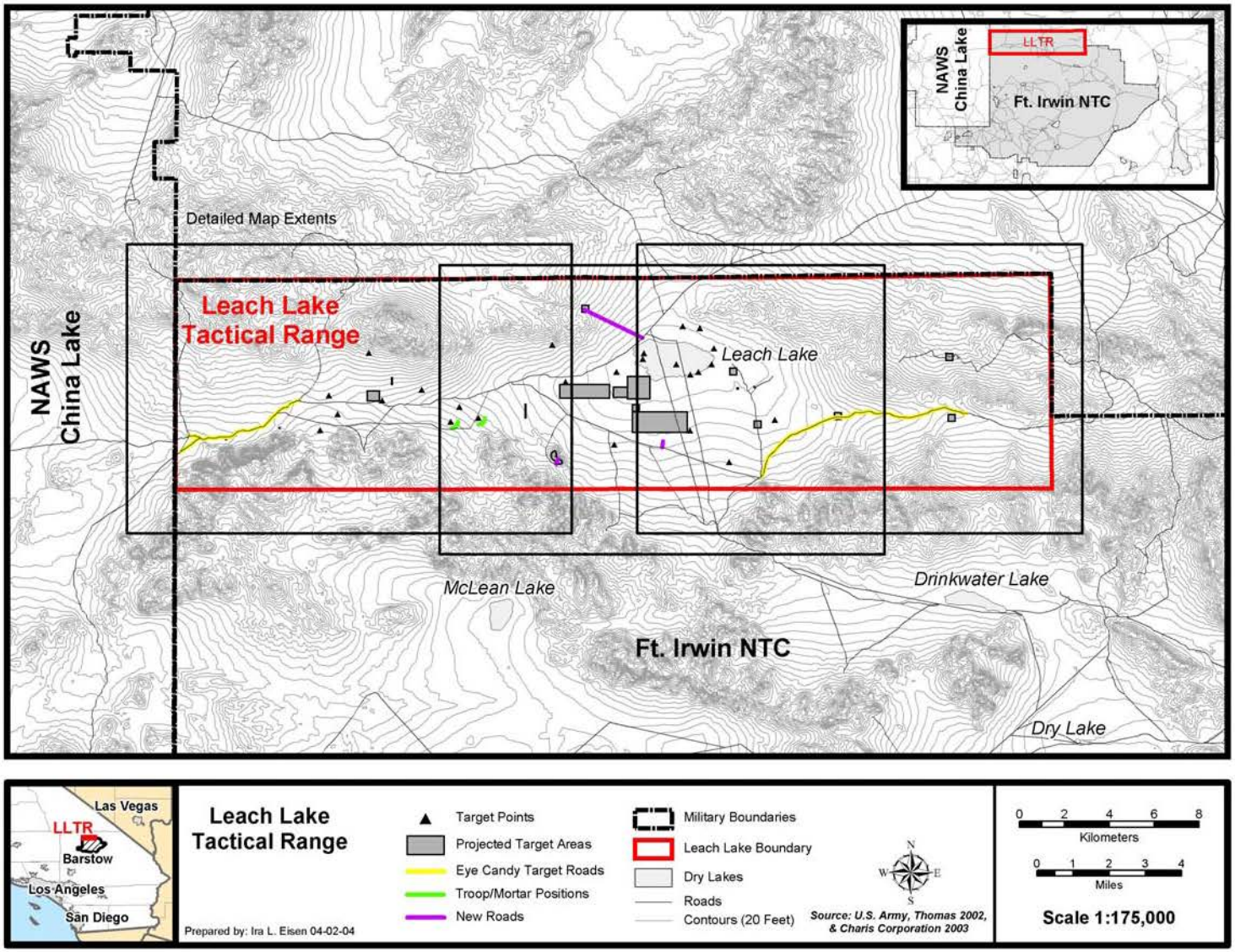

Figure 2-1: Leach Lake Tactical Range – Composite Map

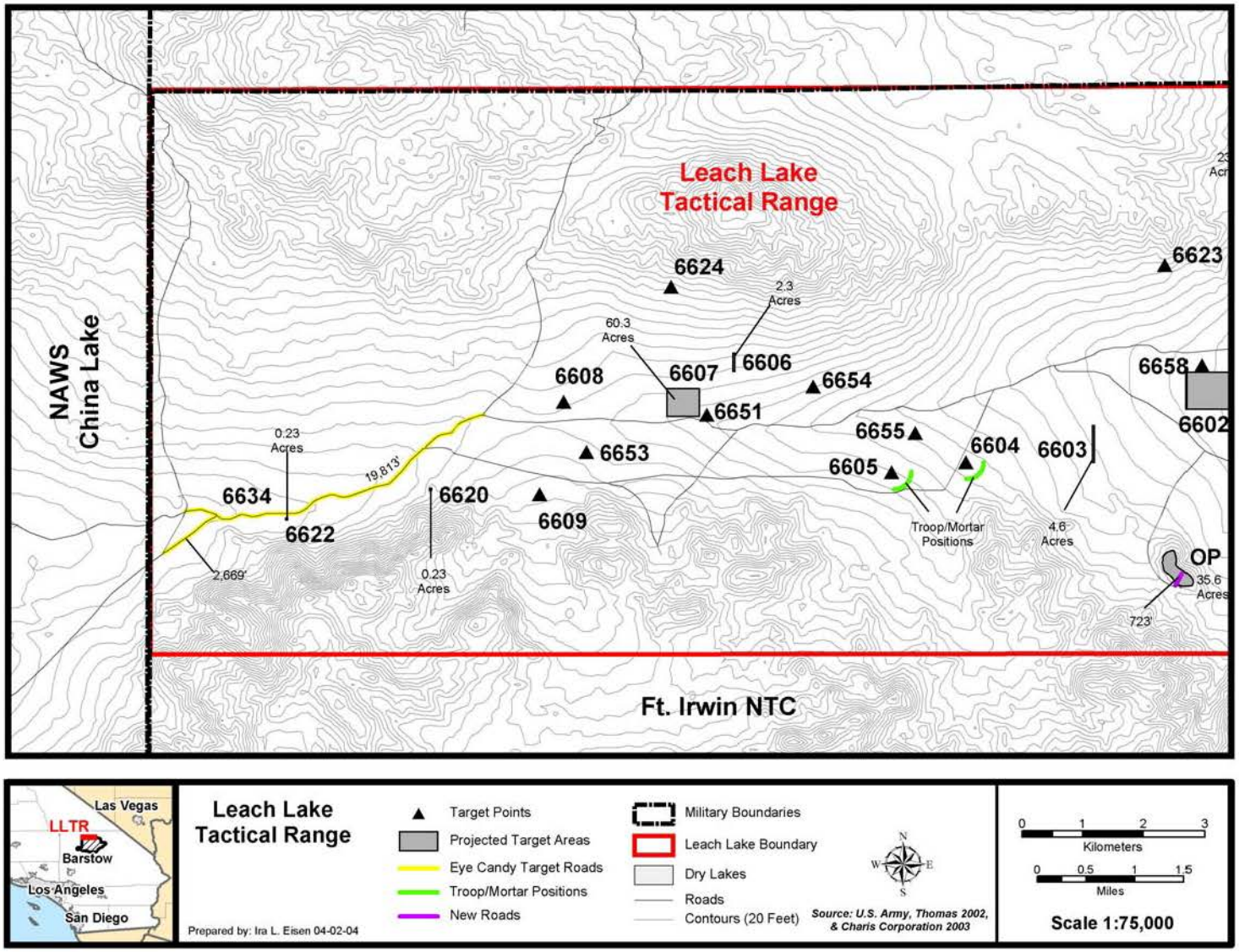

Figure 2-2: Leach Lake Tactical Range – West

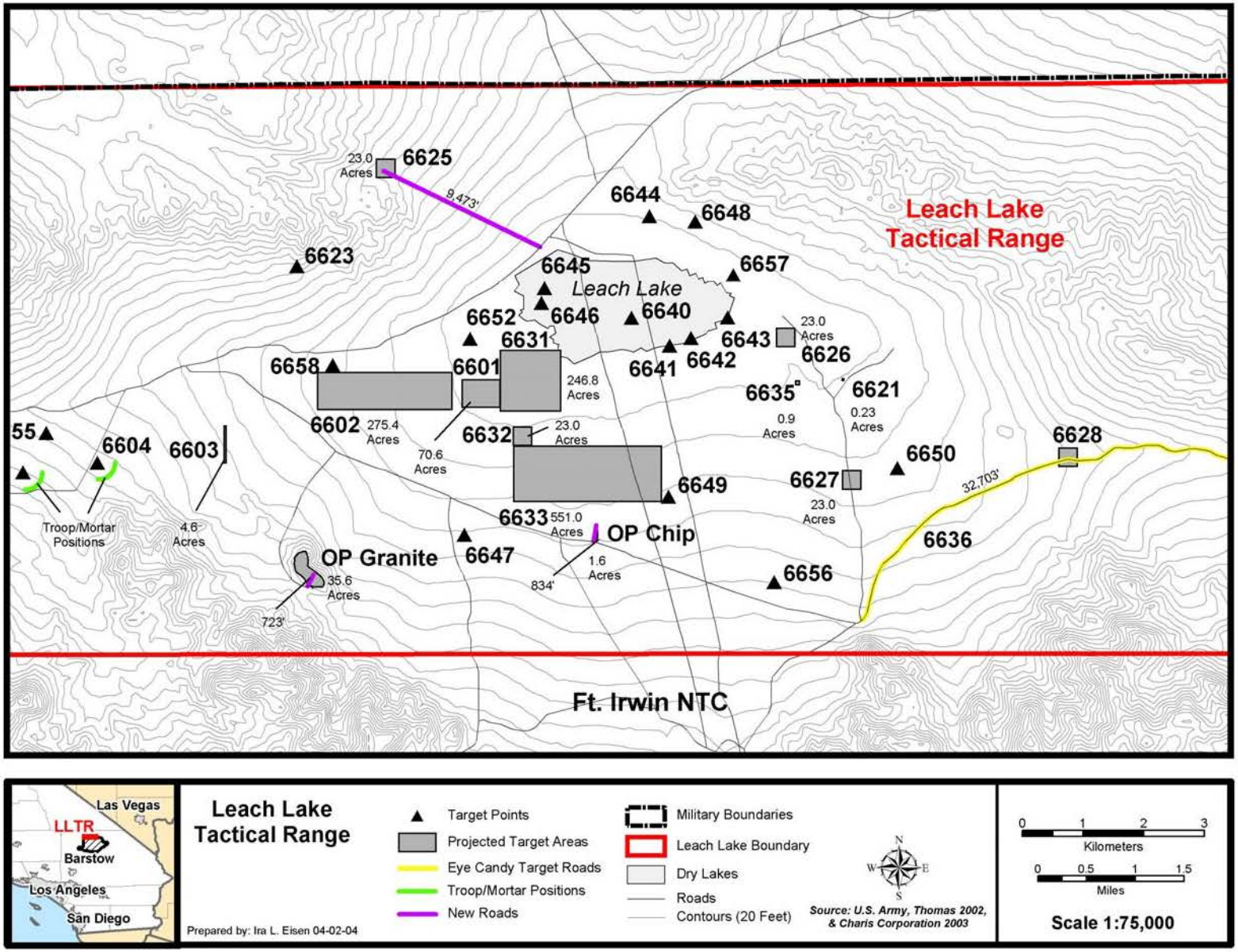

Figure 2-3: Leach Lake Tactical Range – Central

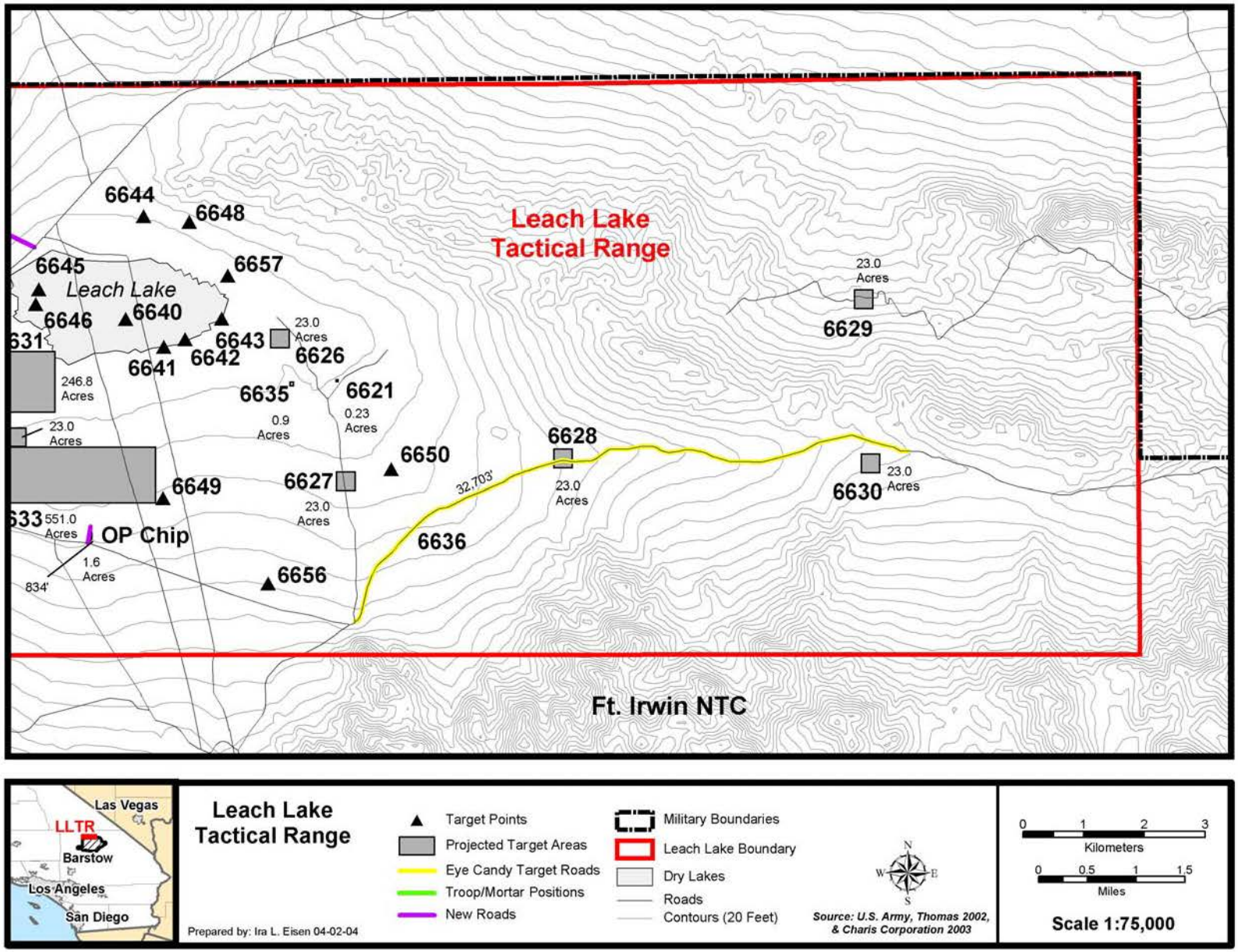

Figure 2-4: Leach Lake Tactical Range – East

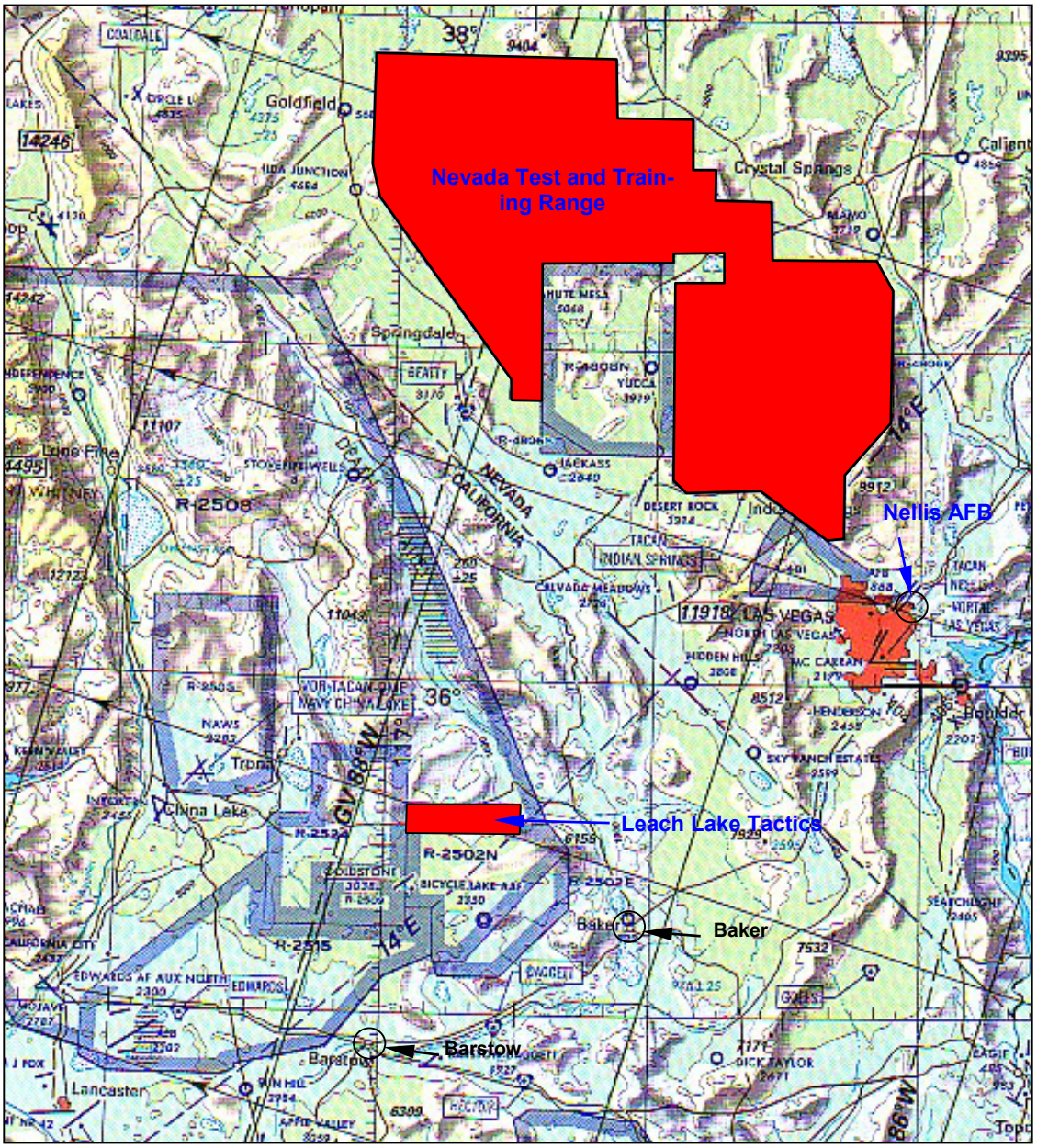

Figure 2-5: Regional Map

Table 2-2: Summary of Alternatives

PROPOSED ACTION	NO ACTION ALTERNATIVE
AIR QUALITY	
The air quality impacts as a result of selecting the Proposed Action would be of short duration (lasting through construction) and isolated to defined area (at and immediately adjacent to the construction sites), and are estimated to be well below *de minimus* levels.	There would be no change to current operations and therefore no additional air quality impacts.
BIOLOGICAL RESOURCES	
To avoid impacts to threatened and endangered species as a result of selecting the Proposed Action for those projects located in undisturbed habitat in the eastern portion of the project area, the USAF will have a biological monitor present when construction activities are taking place and take mitigation measures as outlined in paragraphs 4.2.1.1 and 4.2.1.2.	The No Action Alternative would have no effects on biological resources.
CULTURAL RESOURCES	
A no adverse effects determination with no eligible sites was sent to the California SHPO to address Section 106 of the NHPA.	The No Action Alternative would have no effects on cultural resources.
EARTH RESOURCES	
• New target construction operations would have no impacts to geology and only minor effects to soil resources from blading the area for the first time—these impacts are estimated to be minor as only limited blading would occur. • Wind erosion would be expected to occur on areas where the desert pavement has been broken and/or disturbed; however, the eroded materials (i.e., dust) are expected to remain within the boundaries of the Leach Lake Tactical Range. • Water erosion is expected to occur at various degrees on the new targets that are constructed on sloping terrain. Slight erosion would occur on all soil texture classes on slopes less than 4 percent or sandy soils on slopes less than 15 percent; moderate erosion would occur on loamy and clay soils on slopes of 4-15 percent or sandy soils with slopes of 15-30 percent; high erosion would occur on soils having loamy soils of 15-30 percent or all soils heavier than loam with slopes over 30 percent. Due to low average rainfall, any water erosion would be infrequent and less than significant.	The No Action Alternative would have no effects on geology or soil resources within the Leach Lake Tactical Range.

ENVIRONMENTAL JUSTICE	
The construction projects under the Proposed Action would remain within the currently established range boundaries; therefore, no new affects involving environmental justice would occur as a result of this alternative.	Same as the Proposed Action.
HAZARDOUS MATERIALS/WASTE – SOLID WASTE	
The types of hazardous materials/waste would not change as a result of the proposed action. The amount of solid waste would increase slightly due to the additional target residue for the new targets.	No change to existing conditions as a result of the No Action Alternative.
NOISE	
The noise impacts as a result of selecting the Proposed Action would not change from existing activities.	Same as the Proposed Action.
SAFETY	
The Proposed Action would have beneficial impacts on ground safety, flight safety, and/or range safety due to the placement of a fence and range boundary warning signs, thus further restricting public access to potential hazards in the training range.	Under this alternative, the north entrance to the range has only one gate and no fence delineating range boundaries and no boundary signs warning the public that the area is hazardous and restricted to authorized personnel only. Under the No-Action Alternative, this threat to public safety would continue .
SOCIOECONOMICS	
The construction projects under the Proposed Action would remain within the currently established range boundaries and no change in personnel would occur; therefore, no new affects involving socioeconomics would occur as a result of this alternative.	Same as the Proposed Action.
WATER RESOURCES	
Because the Leach Lake basin is a closed water system in terms of rainfall and storm runoff, waters would remain within the basin and not enter navigable waters of the United States. There are no springs in proximity to the proposed target areas to be effected by operation under the Proposed Action. The Proposed Action would have no negative impacts on water resources.	Same as the Proposed Action.

Chapter 3 – Affected Environment

The procedures established in NEPA require that the analysis address the components of the environment potentially affected by the proposed actions. The environment includes all resource areas and lands that might be affected, as well as the natural, cultural, and socioeconomic resources they contain or support. For this proposal, Nellis AFB managers have examined 10 environmental resources that could potentially be effected by the proposed actions: air quality, biological resources, cultural resources, earth resources, environmental justice, hazardous materials/waste and solid waste, noise, safety, water resources, and socioeconomics.

Region of Influence

Unless further refined in the following resource areas, the Region of Influence (ROI) for this project is defined as the current lateral and vertical boundaries of the Leach Lake Tactical Range. The Leach Lake Tactical Range is withdrawn land. Access is limited to authorized personnel and restricted from public access. The area surrounding Leach Lake is remote and sparsely populated. The closest population center is Baker, California, approximately 26 miles southeast of the range's most southeastern corner.

The Leach Lake Tactical Range also shares a contiguous border to its north with the Death Valley National Park. The Death Valley National Park was established by act of Congress in 1994 through the *California Desert Protection Act (CDPA) of 1994* (CDPA 1994). The *California Military Lands Withdrawal and Overflights Act of 1994*, contained within the CDPA protects current military lands and overflight missions. The act states in Sec. 802, MILITARY OVERFLIGHTS:

> *OVERFLIGHTS—Nothing in this Act, The Wilderness Act, or other land management laws generally applicable to the new units of the National Park or Wilderness Preservation Systems (or any additions to existing units) designated by this Act, shall restrict or preclude low-level overflights of military aircraft over such units, including military overflights that can be seen or heard within such units (CDPA 1994).*

3.1 Air Quality

3.1.1 Definition of the Resource

Air quality at a given location can be described by the concentrations of various pollutants in the atmosphere. Units of concentration are generally expressed in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The significance of a pollutant concentration is determined by comparing the concentration to an appropriate federal and/or state ambient air quality standard. The standards represent the allowable atmospheric concentrations and a reasonable margin of safety to protect the public health, welfare, and the more sensitive receptors in the population. Federal standards, established by the U.S. Environmental Protection Agency (EPA) are termed the National Ambient Air Quality Standards (NAAQS). The NAAQS for all averaging periods other than annual are defined as the maximum acceptable concentrations that may not be exceeded more than once per year. The annual NAAQS may never be exceeded. The state standards, established by the California Air Resource Board (CARB), are termed the California Ambient Air Quality Standards (CAAQS). The CAAQS are defined as the maximum ac-

ceptable pollutant concentrations that are not to be equaled or exceeded, depending on the specific pollutant.

The pollutants considered in the impact analysis of this EA include volatile organic compounds (VOC), Ozone (O_3), Carbon Monoxide (CO), nitrogen oxides (NO_2), sulfur oxides (SO_2), and particulate matter (less than 10 microns) (PM_{10}). Nitrogen oxides and VOC are considered as precursor emissions that form O_3. Airborne emissions of lead and hydrogen sulfide (H_2S) are not addressed in this EA because there are no known significant lead or H_2S emission sources in the region or associated with the project and its alternatives.

3.1.2 Regulatory Setting

The *Federal Clean Air Act (CAA) of 1970* (42 USC § 7401) established the NAAQS and delegated the enforcement of air pollution control provisions of the CAA to the states. The CARB is responsible for enforcing state air pollution laws and regulations. In turn, the CARB has delegated the responsibility of regulating various air emission sources to local air districts. The proposed action must comply with the NAAQS and USAF guidelines, as well as all state and local requirements.

Under the CAA, Section 176(c) requires federal agencies, including the DoD, to ensure that proposed federal actions conform to the appropriate requirements in the State Implementation Plan (SIP) or Federal Implementation Plan (FIP). For federal actions that occur in federal criteria pollutant non-attainment or maintenance areas, the non-permitted activities of a proposed federal action must be evaluated under the general conformity rule (40 CFR § 51). This ensures that the proposed federal action conforms to an applicable SIP. The general conformity rule applies when a state or air district in which a federal action occurs has an EPA approved conformity rule in the SIP, and when the federal action exceeds trigger rates specified in the conformity rule. The Mojave Desert Air Quality Management District (MDAQMD) has an approved conformity rule. The federal action is proposed for an area that is federal non-attainment for PM_{10} only, so conformity analysis is only required for PM_{10}.

Per the CAA, MDAQMD Rules, and USAF guidance the federal agency proposing the action determines general conformity. Federal agencies claiming that a federal action "conforms" are required to provide documentation through an applicability analysis demonstrating that the total direct and indirect emissions of applicable criteria pollutants do not contribute to a violation of the NAAQS or any interim milestones.

3.1.2.1 Air Conformity Statement

The Leach Lake Tactical Range is located in the eastern portion of the Mojave Desert Air Basin within San Bernardino County. This proposed action would occur within the MDAQMD. The military operations occurring within the Leach Lake Tactical Range must comply with federal and/or state ambient air quality standards as defined by the NAAQS, established by the EPA; the CAAQS established by the CARB; and in accordance with MDAQMD Rule 2002. In general, a conformity determination is required for each pollutant where the total of direct and indirect emissions in a non-attainment or maintenance area caused by a federal action would equal or exceed any of the rates specified in the MDAQMD conformity rule. A required conformity analysis would involve comparison of the Federal action with the applicable Federal attainment plan.

Table 3-1: National and State Ambient Air Quality Standards

AIR POLLUTANT	AVERAGING TIME	NAAQS	CAAQS
CARBON MONOXIDE (CO)	8-hour 1-hour	9 ppm 35 ppm	9 ppm 20 ppm
NITROGEN DIOXIDE (NO_2)	Annual 1-hour	0.053 ppm —	— 0.25 ppm
SULFUR DIOXIDE (SO_2)	Annual 24-hour 3-hour 1-hour	0.03 ppm 0.14 0.5 ppm —	— 0.04 ppm — 0.25 ppm
PM_{10}	AGM AAM 24-hour	— 50 µg/m^3 150 µg/m^3	30 µg/m^3 — 50 µg/m^3
OZONE (O_3)	1-hour	0.12 ppm	0.09 ppm

ppm: parts per million
µg/m3: micrograms per cubic meter
AGM: Annual Geometric Mean
AAM: Annual Arithmetic Mean

Table 3-2: Air Quality Criteria Thresholds

THRESHOLD	Units	VOC	CO	NO_X	SO_2	PM_{10}
CONFORMITY ANNUAL	Tons	n/a	n/a	n/a	n/a	100
MDAQMD ANNUAL (NEPA)	Tons	25	100	25	25	15
MDAQMD DAILY (NEPA)	Pounds	137	548	137	137	82

VOC: Volatile Organic Compounds
Source: Mojave Desert Air Quality Management District

3.1.3 Region of Influence

Identifying the ROI for an air quality assessment requires knowledge of the pollutant types, source emission rates and release parameters, the proximity relationships of project emission sources to other emission sources, and local and regional meteorological conditions. For the purpose of this air quality analysis, the ROI for emissions from the proposed action would be the existing airshed surrounding Fort Irwin, California.

3.1.3.1 Climate

The climate in the study area is generally characterized as fair weather. The area experiences hot summers, mild winters, infrequent precipitation, and moderate afternoon breezes. The Sierra Nevada and Transverse Mountain ranges primarily influence the regional winds. Coastal northwest winds do not affect the study area as much as the high desert plain winds from the Los Angeles Basin due to the project area's distance inland. Typical regional winds have an average speed of approximately 15 mph and are generally from the southwest direction measured at Four Corners—a station located in the center of Fort Irwin, California (NTC 2005)—the closest monitoring station where weather data are memorialized.

Mixing altitude of the atmosphere is another factor that contributes to air pollution dispersion patterns. The standard mixing altitude used for emissions calculations within the MDAQMD is 3,280 ft above ground level (AGL) (personal conversation with Alan DeSalvio 2003). The mean average surface altitude within the Leach Lake Tactical Range is approximately 2,000 ft above mean sea level (MSL). Therefore, the mean average mixing altitude would be approximately 5,280 ft MSL (3,280 + 2,000).

Monthly temperatures within the study area range from a maximum of approximately 118ºF to a minimum of approximately 14ºF. The 12-month average high temperature for calendar years 1999 to 2001 was 98.7ºF; the 12-month average low was 29.4ºF. These values were determined from climatic data recorded at 15 Fort Irwin meteorological stations (NTC 2005).

Most of the annual rainfall is produced by mid-latitude storms from August to April. During the summer months, precipitation occurs as a result of widely scattered thunderstorms. Annual average rainfall is approximately 3.87 inches (NTC 2005).

Relative humidity is typically high in the winter and low in the summer. Based on data recorded at the Fort Irwin monitoring stations, the average monthly relative humidity ranges from a high of approximately 56 percent in February to a low of approximately 20 percent in May. The 12-month average relative humidity was 31.8 percent for calendar years 1999 to 2001 (NTC 2005).

3.1.4 Current Conditions

The project area is within the eastern part of the MDAQMD within San Bernardino County. The San Bernardino County portion of the air basin is currently classified and designated as "attainment" for O_3 and as a maintenance area for CO; it is in "non-attainment" for PM_{10}, commonly referred to as "fugitive dust."

Significant atmospheric dust arises from the mechanical disturbance of granular material exposed to the air. Dust generated from these open sources is termed "fugitive" because it is not discharged to the atmosphere in a confined flow stream. Common sources of fugitive dust include unpaved roads, agricultural tilling operations, aggregate storage piles, heavy construction operations, and wind erosion.

3.2 Biological Resources

3.2.1 Definition of the Resource

The Leach Lake Tactical Range lies within the Mojave Desert Ecosystem. The native vegetation consists primarily of desert scrub communities at low to mid-elevations and mixed shrub communities at the mid- to upper elevations. Wildlife includes species that are primarily associated with Mojave Desert scrub and mixed shrub habitats. A wider variety of migratory and widely distributed species are associated with the limited water resources at the desert springs and seasonally flooded playas within the ROI.

3.2.2 Regulatory Setting

Federal and state regulatory documents that apply to this action include:

- The *Endangered Species Act (ESA) of 1973* (16 USC § 1531)
- *The Bald Eagle Protection Act of 1940* (16 USC §§ 668-668d)
- *The Wild Free Roaming Horse and Burro Act of 1971* (16 USC § 1331)
- *The* Migratory *Bird Treaty Act of 1918* (16 USC §§ 703-711)
- Noxious *Weeds—Management of Undesirable Plants on Federal Lands* (7 USC 2814)
- *Executive Order (EO)* 13186*, Responsibilities of Federal Agencies to Protect Migratory Birds* (EO 2001)
- *California Endangered Species Act (CESA)* (Fish and Game Code §§ 2050, *et seq*.)

Existing Fort Irwin environmental documents that include Leach Lake are the *Fort Irwin Integrated Natural Resources Management Plan (INRMP)(Draft)* (DA 2003) and the *Biological Opinion for the Proposed Addition of Maneuver Training Lands at Fort Irwin, California (1-8-03-F-48)* (DOI 2004).

3.2.2.1 Definitions

Federally-Listed Threatened and Endangered – The ESA, as amended, is federal legislation. Its purpose is to protect endangered and threatened species and their critical habitats, and to take steps to recover these species. Endangered species are fish, wildlife, and/or plant species that are in danger of extinction throughout all or a significant portion of its range. Threatened species are those that are likely to become endangered in the foreseeable future. Once a species is listed, all protective measures authorized by the ESA apply to the species and its habitat.

Federal Species of Concern – This is a category of sensitive species that has not been listed, proposed for listing, or placed in candidate status. Species of concern receive no legal protection, and the use of the term does not necessarily mean that the species will eventually be proposed for listing as a threatened or endangered species. The term in-

dicates that the U.S. Fish and Wildlife Service (USFWS) has some degree of concern for the future well being of the taxon, but no legal protection under the ESA is afforded.

State Listed Threatened and Endangered – The CESA is California state legislation that establishes state policy to conserve, protect, restore, and enhance endangered or threatened species and their habitat. Endangered species as defined under the CESA are native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease.

State Species of Special Concern – This category of sensitive species is used by the California Department of Fish and Game. It applies to plants and animals not listed under the federal ESA or the CESA, but which nonetheless 1) are declining at a rate that could result in listing, or 2) historically occurred in low numbers and known threats to their persistence currently exist. This designation is intended to result in special consideration for these plants and animals, and to focus attention on the species to help avert the need for costly listing under the federal and state endangered species laws and recovery efforts that may ultimately be required.

3.2.3 Region of Influence

Leach Lake Tactical Range is located in the northern portion of the Mojave Desert. The Northern Mojave Desert is an extremely arid region that is climatically and floristically distinct from the Sonora Desert to the south and the Great Basin to the northeast. The Mojave Desert ecosystem is approximately 10,000 years old and contains many woody plant and wildlife species that evolved in adjacent habitats or continents; however, as many as one third of the annual plants evolved within the Mojave Desert during the last 10,000 years. Widely spaced, low, evergreen, or winter deciduous shrubs characterize the Mojave Desert. The fauna of the Mojave Desert is well adapted to the sparse precipitation and seasonally variable temperatures.

3.2.4 Current Environment

The U.S. Fish and Wildlife Service (USFWS) list several federally protected species that may occur within the study area (USAF 2004). A search of the *California Natural Diversity Database* (CNDDB) (CDFG 2003) was also done to show the biological makeup of the study area. The result of this literature search is shown in the table below.

Table 3-3: Threatened, Endangered, and Sensitive Species

FEDERAL THREATENED AND ENDANGERED	
BIRD SPECIES	Bald Eagle (*Haliaeetus leucocephalus*) – threatened, fully protected Least Bell's Vireo (*Vireo bellii pusillus*) – endangered Southwestern Willow Flycatcher (*Empidonax traillii extrimus*) – endangered
REPTILE SPECIES	Desert Tortoise (*Gopherus agassixii*) – threatened
FISH SPECIES	Mojave Tui Chub (*Gila bicolor mahavensis*) - endangered
PLANT SPECIES	Lane Mountain Milkvetch (*Astragalus jaegerianus*) - endangered

FEDERAL SPECIES OF CONCERN	
BIRD SPECIES	Burrowing Owl (*Athene cunicularia*) Yellow-Billed Cuckoo (*Coccyzus americanus*)
CALIFORNIA STATE LISTED THREATENED AND ENDANGERED	
ANIMAL SPECIES	Nelson's Bighorn Sheep (*Ovis canadenis nelsoni*) – fully protected Mohave Ground Squirrel (*Spermophilus mohavensis*) – threatened
BIRD SPECIES	Golden Eagle (*Aquila chrysaetos*) – fully protected
REPTILE SPECIES	Desert Tortoise – endangered
CALIFORNIA STATE SPECIES OF SPECIAL CONCERN	
BIRD SPECIES	Bell's Sage Sparrow (*Amphispiza belli* ssp. *belli*) Brewer's Sparrow (*Spizella breweri*) Burrowing Owl (*Athene cunicularia*) California Horned Lark (*Eremophila alpestris actia*) LeConte's Thrasher (*Toxostoma lecontei*) Loggerhead Shrike (*Lanius ludovicianus*) Long-Eared Owl (*Asio otus*) Prairie Falcon (*Falco mexicanus*) Yellow Warbler (*Dendroica petechia*)
PLANT SPECIES	Alkali Mariposa Lily (*Calochortus striatus*)

Source: (USFWS 2004; CDFG 2003)

3.2.4.1 Threatened and Endangered Species

There are several federal and state-listed threatened and endangered species that live on or immediately adjacent to the Leach Lake Tactical Range environment, or could possibly migrate through the project area: Nelson's Bighorn Sheep (state fully protected), the Mohave ground squirrel (state listed), the bald eagle (federal listed), golden eagle (state listed), least Bell's vireo (federal listed), southwest willow flycatcher (federal listed), and the desert tortoise (federal and state listed).

Animal Species

Nelson's Bighorn Sheep. Nelson's bighorn sheep have light brown fur, permanent horns, and generally have a stocky build with short legs and a low center of gravity. These traits enable them to escape predators in rocky and mountainous terrain. Desert bighorn sheep inhabit rocky areas that are generally sparsely vegetated and characterized by steep slopes, canyons and washes primarily above the desert floor on or near mountainous terrain (NTC 2005).

There are at least eight individual Nelson's bighorn sheep that are known to live in the upper elevations of the Avawatz Mountains. There is no evidence to date that these sheep use springs at lower elevations, such as those along the southern edge of Leach Lake Tactical Range near Hellwind Canyon (personal conversation with Mickey Quillman 2002, DA 2003a).

Mohave Ground Squirrel. The Mohave ground squirrel is a medium-sized ground squirrel that is diurnal, exhibits a seasonal cycle of activity, and uses burrows for cover. The Mohave ground squirrel occupies all major desert scrub habitats in the western Mojave Desert. It has been observed in the following habitats, which are found throughout its range: Mojave creosote scrub, desert saltbush scrub, desert sink scrub, desert greasewood scrub, shadscale scrub, and Joshua tree woodland. In the northern portion of its range, the Mohave ground squirrel is found in Mojave mixed woody scrub. It inhabits areas with flat to moderate terrain and is not generally found in steep contours. The species has been found most frequently in sandy, alluvial soils; it is also found in gravelly, and occasionally rocky soils. Specific habitat requirements include the availability of food resources and soils with appropriate composition for burrow construction. The presence of shrubs that provide a reliable food source during drought years may be critical for a population to persist in a particular area (NTC 2005).

The Mohave ground squirrel occupies portions of Inyo, Kern, Los Angeles and San Bernardino counties in the western Mojave Desert. The species ranges from Palmdale (Los Angeles County) in the southwest to Olancha (Inyo County) in the north. The northern extent of its range includes the Coso Range and the Argus Range (Inyo County) in the northwest and the Avawatz Mountains and the Soda Mountains (San Bernardino County) in the northeast. The southern extent of its range includes Palmdale in the southwest and the Mojave River in the southeast. The San Bernardino and San Gabriel Mountains limit the species' distribution further south (NTC 2005). No Mohave ground squirrels were observed during the biological survey.

Bird Species

Bald Eagle. The bald eagle is our national symbol and one of North America's largest birds. In California, bald eagles may be found throughout the state at lakes, reservoirs, rivers, and some rangelands and coastal wetlands during the winter months. In the winter, they roost communally in dense, sheltered remote conifer stands. The breeding habitats in California are mainly in mountain and foothill forests and woodlands near lakes, rivers, and reservoirs. Most breeding territories are in northern California. However, they also nest at a few scattered locations in the Sierra Nevada Mountains and foothills, at several locations from the central coast to inland southern California, and on Santa Catalina Island. Bald eagles perch high on large limbs in tall trees, in broken topped trees, on snags, or on rocks near water (NTC 2005).

The range of the bald eagle occurs entirely within North America, including Alaska, Canada, the lower 48 states, and northwest Mexico. Bald eagles are fairly common as local winter migrants at a few favored inland waters in southern California, which include Big Bear Lake, Cachuma Lake, Lake Mathews, Nacimiento Reservoir, San Antonio Reservoir, and along the Colorado River. The bald eagle has been observed at Harper Lake, the Piute Ponds on Edwards AFB, along the Mojave River, and in the Cady Mountains southwest and south of the Study Area. The Study Area does not contain habitat that is likely to support bald eagles. The bald eagle may occur as a migrant in the Study Area. The likelihood of occurrence of the bald eagle in the study area is low (NTC 2005). No bald eagles were observed during the biological survey.

Golden Eagle. Golden eagles are found in open terrain habitats including grasslands, deserts, savannahs, and early successional stages of forest and shrub habitats. They nest on cliffs and in large trees in open areas. Golden eagles breed from Alaska east

across northern Canada and south to Mexico. They winter in the southern part of their breeding range (NTC 2005). Though golden eagles are not known to reside or frequent the project area, they have been observed in the area during the migratory seasons. No golden eagles were observed during the biological survey.

Least Bell's Vireo. The least Bell's vireo is a small songbird associated with riparian habitats. The least Bell's vireo typically breeds in willow riparian forest supporting a dense, shrubby understory of mulefat and other mesic species. They have also been observed to use oak woodland with a willow riparian understory. Individuals sometimes enter adjacent chaparral, coastal sage scrub, or desert scrub habitats to forage. The least Bell's vireos in California occur in riparian forest dominated by willows and tend to avoid riparian areas dominated by non-native salt cedar (*Tamarisk ramosissima*) (NTC 2005).

The least Bell's vireo breeds in southwestern California and adjacent northwestern Baja California. It largely occurs in southern California, but it does extend into areas along the western flank of the Anza-Borrego Desert (San Diego County), in the vicinity of Palm Springs (Riverside County), in Leona Valley (Los Angeles County), in Morongo Valley (San Bernardino County), and along the Mojave River. There are breeding records for this subspecies north in the southern Owens Valley (Inyo County), and it regularly breeds just northwest at the South Fork Kern River Preserve. Elsewhere in the West Mojave Desert, the least Bell's vireo is an occasional migrant (NTC 2005).

The eastern limit of the range of the least Bell's vireo in California is contentious, in that the ranges of the least Bell's vireo and the Arizona Bell's vireo (*V. b. arizonae*) in California are based more on supposition than on direct evidence. It is generally believed that the Arizona Bell's vireo is confined to the Lower Colorado River Valley, whereas the least Bell's vireo occurs in cismontane southern California and on the western edge of the deserts, extending north up the Mojave River into the Owens Valley, and eastward into Death Valley National Park, along the Amargosa River (Inyo County) and at Fort Piute in the East Mojave Desert. The breeding population along the Mojave River is south of the project area (NTC 2005). No least Bell's vireos were observed during the biological survey.

Southwestern Willow Flycatcher. The southwestern willow flycatcher breeds in dense riparian habitats along rivers, streams, or other wetlands across the southwestern U.S. The riparian woodland used by willow flycatchers typically is next to, or over, water and has a canopy and understory of shrub and sapling vegetation. The vegetation composition of occupied habitats varies between sites and may include one or more of the following: native willows, ash, alder, coast live oak, mature nonnative tamarisk, cottonwoods, box elders, and nonnative Russian olive (NTC 2005). No southwestern willow flycatchers were observed during the biological survey.

Reptile Species

Desert Tortoise. The desert tortoise is a medium-sized, terrestrial turtle in the family Testudinidae. Its unhinged shell is colored in shades of brown with faint orange or yellow in the centers of some scutes (the keratinized shell cover). Muted mottling is variously present in the plastron (ventral shell), especially in juvenile tortoises. They range in length from about 1.4 inches (35 mm) at hatching to 11-16 inches (28-40 cm) for adults in weight from .04 to 15 pounds (.02 to 6.9 kg) (NTC 2005).

The desert tortoise occupies arid habitats below approximately 4,000 ft AMSL (1,200 m). Common vegetation associations in the Mojave Desert include creosote bush scrub, saltbush scrub, Joshua tree woodland, and Mojave yucca communities. Because of the burrowing nature of desert tortoises, soil type is an important habitat component. In California, desert tortoises typically inhabit soft sandy loams and loamy sands, although they are also found on rocky slopes and in rim-rock that provide natural cover sites in crevices. In portions of Nevada and elsewhere, where a near-surface durapan limits digging, desert tortoises often occupy caverns in the exposed caliche of wash banks. Hills with round, exfoliating granite boulders often support higher densities of desert tortoise than surrounding flat areas, especially in Arizona. Valleys, alluvial fans, rolling hills, and gentle mountain slopes are also inhabited. Playas and steep, talus-covered slopes are avoided (NTC 2005). Though some evidence of tortoise burrows were discovered in the far eastern portion of the study area, no desert tortoises, burrows, or scat were observed within the immediate vicinity of current or proposed target areas during the biological survey.

Fish Species

There are no standing bodies of water in the project area in which fish would be present.

Plant Species

Lane Mountain Milkvetch. The project area is outside the habitat range of the Lane Mountain Milkvetch.

3.2.4.2 Sensitive Species

Bird Species

The LeConte's thrasher, loggerhead shrike, and long-eared owl were observed in Hellwind Canyon (McCalvin and Pereksta 1994). Field surveys by Harmsworth and Associates have shown that sensitive bird species use the Cave Springs, approximately 5 miles to the east of the Leach Lake Tactical Range boundary (NTC 2003a). These sensitive species primarily use the higher elevations of the Leach Lake Valley and only occasionally use the central portion of the valley. The Bell's sage sparrow, Brewer's sparrow, California horned lark, loggerhead shrike, yellow warbler, and prairie falcon were observed in the other mountain canyons of the Leach Lake Tactical Range (McCalvin and Pereksta 1994). Prairie falcons have been observed in the area.

Burrowing Owl. The burrowing owl is a BLM sensitive species, a CSSC, and a FSOC. Within California burrowing owls are found in open dry habitats including grasslands, prairie, and desert floors. Burrowing owls breed from Canada south through most of the western U.S. and Central America to the southern tip of South America. Northern populations migrate to the southern extent of their breeding range, while southern populations are largely non-migratory. Burrowing owls within the Mojave Desert are largely resident. The burrowing owl has been observed at locations south and southwest of Fort Irwin including Harper Lake, Edwards AFB, and several locations along the Mojave River near Barstow. The burrowing owl was petitioned for state listing as threatened or endangered by a coalition of conservation groups in April of 2003 (NTC 2005).

California Horned Lark. California horned larks are resident to a variety of open habitats with low sparse vegetation, typically without trees and large shrubs. The range of California horned larks includes most of North America. California horned larks are yearlong residents within the state and are found from grasslands along the coast and deserts near sea level to alpine dwarf-shrub habitat above the tree-line. They are less common in the North Coast mountain regions and in coniferous or chaparral habitats. Flocks of the desert lowlands and other areas of California are augmented by winter visitants, many migrating from outside of the state. California horned larks have been observed within [Fort Irwin] and are likely permanent residents (NTC 2005). No California Horned Larks were observed during the biological survey.

LeConte's Thrasher. LeConte's thrasher inhabits desert flats; washes, and alluvial fans characterized with scant vegetation, usually cholla and creosote bush, and sandy or alkaline soils. If available, golden cholla is preferred for nest sites. However, in some areas, allscale is the only suitable host plant for nesting. LeConte's thrasher is a non-migratory bird that is endemic to southern California, southern Nevada, southwestern Utah, western and central Arizona, and northwestern Mexico. It is found in desert scrub across the Mojave Desert of California. It occurs in the Antelope Valley (Los Angeles County), north to Ridgecrest and NAWS China Lake (Kern County). It also occurs along the northern base of the San Bernardino and San Gabriel Mountains, throughout Joshua Tree National Park and into the Owens and Panamint valleys. It has been observed throughout [Fort Irwin]. LeConte's thrashers occur on [Fort Irwin] and are potential resident year round (NTC 2005). No LeConte's threshers were observed during the biological survey.

Loggerhead Shrike. The loggerhead shrike occupies arid and semi-arid habitat throughout lowlands with suitable hunting perches. Densely vegetated areas are avoided. The loggerhead shrike's range extends across North America from Canada to southern Mexico. Breeding birds in California deserts probably remain as resident, while migrating loggerhead shrikes arrive in these areas in winter. Loggerhead shrikes are widely distributed throughout the Mojave Desert. Loggerhead shrikes were observed throughout [Fort Irwin]. [Fort Irwin] lies within the species' range, and it is likely a permanent resident (NTC 2005). No loggerhead shrikes were observed during the biological survey.

Long-Eared Owl. The long-eared owl is a medium sized owl and one of the most strictly nocturnal of all owls. Long-eared owls use bottomland habitats with tall willows and cottonwoods or belts of live oaks adjacent to stream courses and open land. Within the desert long-eared owls are generally found resting and/or roosting in willows, cottonwoods, junipers, native live oak, dense plantings of tamarisk, elms, and conifers. Within North America the long-eared owl is found across central Canada, south across the northeastern U.S., and within most of the western U.S. The long-eared owl winters in the southern part of its breeding range. While there is some influx of wintering owls that occurs in California deserts, it is not clear if the majority of these birds are winter visitors. Long-eared owls have been observed in a tract of cottonwoods and willows along the Mojave River near Victorville (BLM 2002u). The long-eared owl may occur as a migrant in the Project Area (NTC 2005). No long-eared owls were observed during the biological survey.

Prairie Falcon. Prairie falcons breed from Canada south through the western half of the U.S. into Mexico and winter throughout their breeding range. Habitat for the falcon in-

cludes barren mountains, prairies, perennial grasslands, savannahs, rangeland, some agricultural fields, and desert scrub. Prairie falcons nest on cliffs in rugged mountain ranges, usually within a half-mile of a water source. They are found throughout the western Mojave Desert. Prairie falcons have been observed foraging near the eastern portion of [Fort Irwin] in the Avawatz Mountains. Prairie falcons are likely residents, as well as winter visitors to [Fort Irwin]. Prairie falcons may roost and nest in the mountain ranges of [Fort Irwin} (NTC 2005). No prairie falcons were observed during the biological survey.

Yellow-Billed Cuckoos. Yellow-billed cuckoos have one of the most restrictive suites of macro-habitat requirements of any bird species. The habitat type, size and configuration are extremely important. During the breeding season in California, yellow-billed cuckoos are confined to cottonwood-willow riparian habitat (NTC 2005).

Yellow-billed cuckoos have a wide distribution throughout North America. They breed from the West Indies and the northern third of Mexico, north to extreme southern Canada and winter from northern South America, south to northern Argentina, primarily east of the Andes. The western subspecies, the California yellow-billed cuckoo (*C.a. occidentalis*), has a much smaller range and more restrictive habitat requirements. It breeds in California, Idaho, Utah, Arizona, New Mexico, Texas, possibly Nevada, and western Colorado at dispersed locations where suitable habitat is located. The majority of yellow-billed cuckoos in California are found along the upper Sacramento River and at the South Fork Kern River, with the remaining cuckoos at other various locations, including the Mojave River near Hodge, southwest of the Study Area. Cuckoos have been observed during the breading season along the Mojave River between Victorville and Barstow. However, there are no confirmed nesting areas within this region of the Mojave Desert. Yellow-billed cuckoos could occur at any desert oasis with willow and cottonwoods, although there are very few records of migrant yellow-billed cuckoos in the vicinity (NTC 2005). No yellow-billed cuckoos were observed during the biological survey.

Yellow Warbler. The yellow warbler is a wood warbler. Within the California desert, yellow warblers occupy riparian woodland or forest habitat dominated by cottonwoods and willows. Yellow warblers have a vast range that extends throughout most of North America, and they winter in the tropics. Three subspecies of yellow warblers nest in California: *D. p. brewsteri* along the Pacific coast and a few desert locations, *D. p. morcomi* from the Sierra Nevadas to the Great Basin, and *D. p. sonorana* along the Colorado River. Yellow warblers are common migrants through southeastern California. Within the Mojave Desert yellow warblers are known to nest at the Mojave River at Victorville, Camp Cady, and Morongo Valley. Yellow warblers are found at springs and the installation all summer to breed. The long-eared owl may occur as a migrant in the Project Area (NTC 2005). No yellow warblers were observed during the biological survey.

Plant Species

Alkali Mariposa Lily. Alkali mariposa lily is a perennial of the Liliaceae family. Alkali mariposa lily occurs in calcareous sandy soil in seasonally moist alkaline habitats including alkali meadows, ephemeral washes, vernally moist depressions, and at seeps within saltbush scrub (NTC 2005).

Alkali mariposa lily is endemic to moist alkaline areas in the arid interior of southern California and southern Nevada. It occurs in the southern Sierra Nevadas; in the western,

central, and southern Mojave Desert; at the north base of the San Bernardino Mountains; in the southern San Joaquin Valley; and discontinuously in southern Nevada. Populations recorded in the region include: the San Bernardino Mountains at Cushenbury Springs and Box "S" Springs; Lucerne Valley (at Rabbit Spring); north of Barstow (which may be the same as the next); Paradise Springs near Fort Irwin; Edwards AFB, north of Lancaster; and Red Rock Canyon State Park (NTC 2005).

University of California-Los Angeles (UCLA) personnel observed two plant individuals at Two Springs in 1993-1994 (Gibson et al. 1994). No evidence of this species was observed in the fall 2003 surveys. The most probable reason is due to overgrazing by feral burros that are known to regularly use this spring. Habitat for this species on Leach Lake Tactical range does not occur outside the spring areas.

3.2.4.3 Other Biological Resources

Wildlife

Fort Irwin is home to at least 31 mammal, 32 reptile, 187 bird, and thousands of insect species. There are no native fish or amphibians on Fort Irwin. The USFWS completed wildlife studies and species lists for Hellwind Canyon in 1994 (McCalvin and Pereksta 1994). This area should have the most species of wildlife within Leach Lake Tactical Range due to the presence of trees and surface water. In that survey, 8 lizard, 4 snake, 76 bird, and 13 mammal species were observed in washes near the springs or adjacent creosote bush scrub, riparian woodland, and desert wash vegetation of the northern Granite Range. This relatively wildlife-rich habitat is not indicative of the project area; most of the proposed construction sites are located on dry alluvial fans and in undisturbed areas (Charlton 2004).

Migratory Birds and Other Raptors

Birds may be permanent residents, overwinter, nest, or occasionally pass through the study area during migration. The diversity and density of bird species in the Mojave Desert is relatively low, especially at the lower elevations vegetated by saltbush scrub. The low numbers and lack of bird diversity is due to the absence of permanent water sources and lack of a tree overstory that is used by birds for cover and foraging. Seed-eating birds are generally found at lower elevations. The most commonly observed birds in the area include black-throated sparrows (*Amphispiza bilineata*), house finches (*Carpodactus mexicana*), Gambel's quail (*Callipepla gambellii*), ground and morning doves (*Zenaida macroura*), and other sparrows such as the white crowned sparrow (*Zonotricha leucophrys*) and fox sparrow (*Passerellqa iliaca*).

Fall and spring migrants use springs and other sources of water. Riparian and forest dwellers such as vireos and warblers may be observed using springs in the study area during migration periods. Springs are a valuable water resource to most resident and migratory bird species.

Approximately 120 species of birds pass through the study area during migration. Costa's hummingbirds (*Calypte costae*) nest in the Mojave Desert, and Anna's hummingbirds (*Calypte anna*) overwinter in the area. Cactus rock wrens (*Salpinctes obsoletus*) and canyon wrens (*Caterpes mexicanus*) use the rocky canyons and boulder piles in the area. In addition to the previously mentioned golden eagle and prairie falcon, other migrant raptor species that have also been observed in the area include red-tailed

hawks (*Falco jamaicensus*), the most common raptor, and northern harriers (*Circus cyaneus*). The barn owl (*Tyto alba*) is the most common nocturnal avian predator in the area. It usually roosts in abandoned buildings and large trees on homesteads. Turkey vultures (*Cathartes aura*) may also be observed in the area in the fall during migration.

Floristics and Vegetation

Leach Lake is located in the northern portion of the central Mojave floristic province (Rowlands *et al.* 1992). The central Mojave Desert is one of the smallest and least diverse of the five floristic provinces because it lacks extremes in topographic diversity. Approximately 550 plant species occur in the central Mojave Desert. Approximately 137 plant species have been documented (Charlton 2003, McCalvin and Pereksta 1994) as occurring within the Leach Lake Basin. The most diverse vegetation was the Mojave mixed woody scrub and the wetlands around Leach Springs. During the fall 2003 plant species survey of the study area, 60 plant species were observed. The most common plant community within the study area is creosote bush scrub, which comprises 70 percent of the Mojave Desert and 91 percent of the Leach Lake Basin (Charlton 2004). All proposed projects, except for two observation points in the Granite Range, are located in creosote bush scrub. The two observation points are located in Mojave mixed woody scrub.

The Mojave Desert Ecosystem Program (MDEP) personnel have completed the most accurate vegetation maps of the area. The maps describe five plant communities in the Leach Lake Basin: creosote bush scrub, Mojave mixed woody scrub, saltbush scrub, desert wash scrub, and desert sink scrub. Fieldwork conducted for this project found that the desert sink scrub does not exist, and three very small alkaline meadow and seep habitats were previously overlooked. The saltbush and alkali sink communities are allscale saltbush scrub vegetation.

3.3 Cultural Resources

3.3.1 Definition of the Resource

Cultural resources are prehistoric and historic districts, sites, structures, artifacts, and any other physical evidence of human activities considered important to understanding a culture, subculture, or community for scientific, traditional, religious or other reasons. Cultural resources are divided into three categories:

- Prehistoric and historic
- Historic buildings and structures
- Traditional cultural properties

The *Army Cultural Resources Management Plan* (USACE 2002) defines and explains these categories.

Native American and Euroamerican archaeological resources are locations where human activity measurably altered the earth or left deposits of physical remains (e.g. stone tools, projectile points, bottles, etc.). In this discussion, Native American archaeological resources pre-date the beginning of written records. In the Central Mojave Desert, they range from isolated stone tools to village sites. Euroamerican resources are defined as

those formed after the beginning of written records. Euroamerican archaeological resources on Fort Irwin include campsites, roads, fences, trails, dumps, and a variety of other features.

Architectural and cultural landscape resources include standing buildings, dams, canals, and bridges. Resources also include designed landscapes, rural landscapes, and other structures or landscapes of historic aesthetic, or scientific significance. The structures must generally be 50 years of age or older, although military buildings and structures from the Cold War Era (1946-1989) can be considered significant architectural resources if they were of exceptional importance to the nation's military history.

3.3.2 Regulatory Setting

Under federal law, impacts to cultural resources may be considered by agencies to be adverse if the resources are generally those that are eligible for nomination to the *National Register of Historic Places (NRHP)* established by the *National Historic Preservation Act (NHPA) of 1966* (36 CFR § 60.4). Or those that are important to Native American or other traditional groups as outlined in the *American Indian Religious Freedom Act (AIRFA) of 1978* (42 USC § 1996), the *Native American Graves Protection and Repatriation Act (NAGPRA) of 1990* (25 USC §§ 3001-3013), and *EO 13007, Indian Sacred Sites Executive Order* (EO 13007). Cultural resources that have been determined eligible for inclusion in the HRHP are called "historic property." An historic property must be more than 50 years old unless considered of exceptional importance in understanding, for example the Cold War.

To be considered eligible for nomination to the National Register, Native American and Euroamerican archaeological resources, architectural resources, landscapes, and traditional cultural properties must meet one or more of the criteria outlined in NRHP. Significant resources are those that:

- are associated with events that have made a significant contribution to the broad patterns of our history;
- are associated with lives of persons significant in our past;
- embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; or
- have yielded, or may be likely to yield, information important in prehistory or history.

3.3.3 Region of Influence (Moffitt and Moffitt 2005)

The ROI used for the cultural resource analysis lies within the current NTC withdrawn land encompassed within the boundaries described as Leach Lake Tactical Range, located in the north central Mojave Desert region of southern California. The Mojave Desert lies within the culturally and geographically defined area known as the southwestern Great Basin. Traditionally, prehistoric evidence for human occupation in the Mojave Desert was identified by the presence of artifacts including flaked stone and groundstone tools. Artifacts within assemblages were analyzed and type markers, usually based on

point morphology, were established for determining relative chronological associations. Early archaeological investigations generally include basic field notes lacking detailed information regarding provenience of artifacts and features. Generally, archaeological sites found within the deserts of California are often spread across the surface and lack soil depth. Early research tended to focus their efforts on locating sites near water sources including ancient lakebeds, riverbeds, washes, sinks, and springs. The early research efforts of Malcolm Rogers (1929, 1939), and Elizabeth Campbell (1931, 1936; Campbell and Amsden 1934), provide early historic attempts to establish chronological sequences based on similarities or patterns observed within archaeological assemblages recovered from the Mojave Desert region.

Elizabeth Campbell (1936) was the first to introduce a cultural sequence for the Mojave Desert region. Her sequence included in the earlier Pinto and Silver Lake Cultures associated with sites located along high terraces near shore of present-day skinks or extinct rivers; followed by the Big Blade Camps with sites located near present-day water holes and shores of ephemeral sinks; continuing with cultures associated with arrow points but containing no pottery, and concluding with an Arrow point cultural group associated with pottery. In 1939, Malcolm Rogers defined the following cultural sequences: the Malpais based on a poorly defined core and flake industry, the Playa Industry (Lake Mohave Complex), the Pionto-Gypsum Complex, the Armagosa Industry I (without pottery) and II (with pottery), and the late prehistoric Yuman culture group. Rogers later changed his categories; however, problems prevailed in his terminology and conflicting descriptions. Vast differences are found in the proposed chronologies of Campbell and Rogers, as Campbell dated human use of the Mojave Desert from 15,000 B.P. (Campbell and Campbell 1935; Campbell 1936; Campbell et al. 1937), while Rogers indicated the earliest human occupation of the area occurred ca. 4000 B.P. (Rogers 1939). Although, both Campbell and Rogers contributed to our knowledge of prehistoric in the Mojave Desert, Roger's chronology provided the foundation for later work by researchers.

In the 1950s and 1960s chronological sequences for the Mojave Desert were proposed by Wallace (1962), who spent over two decades conducting research in the Death Valley area. Wallace established a Death Valley sequence and incorporated Roger's 1939 sequence into his work on California deserts with some modifications. Wallace proposed the earliest human occupation at ca. 9000 B.P. (Lake Mohave period), including a period of abandonment of the desert by about 7000 B.P., followed by reoccupation of the area ca 5000 B.P. to the historic period. Cultural sequences determined during this time period by Wallace (1962) include Pinto (ca. 5000-2000 B.P.), Saratoga Springs (ca. 2000-1000 B.P., and Shoshonean-Yuman (ca. 1000 B.P. to historic period). This chronology was adopted by Hunt (1960) during his work in the Death Valley region. During the 1960s, Lanning (1963) established a cultural chronology using stratigraphic information and data collected from cross-dating artifacts recovered from the Rose Springs site (CA-INY-3732), located south of Owens Lake in Rose Valley.

More recent chronologies used by present researchers include those developed by Bettinger and Taylor (1974), and Warren and Crabtree (1986). Bettinger and Taylor established a new chronology as earlier versions were found inadequate "for distinguishing and temporally ordering extinct socio-cultural groups" (Bettinger and Taylor 1974). These chronologies are comparable for approximately the past 1,500 years but reflect a significant split in opinion among archaeologists regarding the temporal placement of earlier point forms (e.g., Lake Mohave, Silver Lake, and Pinto). The two primary chro-

nologies used in the Great Basin culture region to date the placement of early points include the *short chronology* and the *long chronology*. Considering the Pinto Point, those proponents of the *short chronology* argue that Pinto points are associated with ephemeral lakes, streams, and springs suggesting occupation during the Little Pluvial, dated between 5000-4500 B.P., into the onset of Christian era (Wallace 1962). Proponents of the *long chronology* argue that Pinto lithic assemblages developed from Lake Mohave assemblages and indicate a long cultural continuum (Tuohy 1974; Warren 1980).

The *short chronology* is supported by Bettinger and Taylor (1974) with the establishment of five chronological categories based on radiometric data representing the Great Basin area. These categories include the Lake Mohave period (ca. pre 6000 B.P.), followed by Little Lake period (ca. 1350-650 B.P.), Newberry period (ca. 3150-1350 B.P., Haiwee period (ca. 1350-650 B.P.), and Marana period (ca. 650-100 B.P.). The *long chronology* is supported by Warren and Crabtree (1986) and is evident in their model including the division of five chronological categories. These categories are described as follows: the Lake Mohave period (pre ca. 7000 B.P.), the Pinto period (ca 7000-4000 B.P.), the Gypsum period (ca. 4000-1500 B.P.), the Saratoga Springs period (ca. 1500-650 B.P.), and the Shoshonean period (ca. 650-100 B.P.).

Table 3-4: Comparative Terminology For Present Chronological Models (California Deserts)

BETTINGER AND TAYLOR (1974)	WARREN AND CRABTREE (1986)
Marana	Shoshonean
Haiwee	Saratoga Springs
Newberry	Cypsum
Little Lake	Pinto
Lake Mohave	Lake Mohave

3.3.4 Current Conditions

In 1988 archaeologist Richard Norwood researched this area, conducted a one-day field survey, and wrote a report summarizing the knowledge of Leach Lake Basin archaeology (Norwood 1989). He noted that the Malcolm Rogers of the San Diego Museum of Man did the first known archaeological research of the area in the 1920s. The study identified archaeological sites at Leach Springs, Two Springs, and Leach Lake playa lakebed. No site-specific reports were generated but the information was used for theories on the use of the Mojave Desert by Native Americans published in 1939 and 1945 (Norwood 1989).

In 1948 the San Bernardino County Museum did cultural resource surveys in Leach Lake Basin (Sheppard and Smith 1948). They reexamined the three known sites and made collections of artifacts, some significant. Kaldenberg visited the basin in 1976 and wrote an overview of the archaeology of the central Mojave in 1980 (Kaldenberg 1981).

Between 1980 and 1985, when Fort Irwin became the National Desert Training Center for the Army, the Interagency Archaeological Services began developing a long-term

Cultural Resources Management Plan (CRMP) for Fort Irwin. This project included fieldwork in the Leach Lake Basin. After 1985, inventorying cultural resources at Fort Irwin became the responsibility of the Directorate of Public Works (DPW). A report on the *Late Holocene Archaeology of Drinkwater Basin, Fort Irwin, San Bernardino County* (Basgall *et al.* 1988) is the only document specifically for the northern central Mojave Desert. Archaeological studies on the nearby Salt Creek-Amargosa Drainage are within the Northern Mojave Desert, a different cultural region.

The results of the Norwood (1989) report documented 11 sites, of which 3 were the previously recorded sites. Norwood defined a site as having 10 or more artifacts or a site feature (Edwards AFB protocol). A few isolated flakes and a possible prehistoric/historic trail were also documented. The 11 sites are listed below.

Table 3-5: Leach Lake Basin Archaeological Sites

SITE NAME	PREHISTORIC	HISTORIC	DESCRIPTION
LEACH SPRINGS	P	H	Flakes, ground stone, rock cabins, tank, corral
TWO SPRINGS	P	H	Rock art, eligible for the NRHP
EAST SIDE ROCK	P		Rock ring
HAMMERSTONE MOUND	P		Chipping station, suitable material from a wash
TENTPAD WEST	P	H	Rock cairn and historic tentpad
NW CHERT QUARRY[1]	P	Paleo	Eligible for nomination to the NRHP
CENTRAL MINING COMPLEX		H	Historic mine shafts, well, 2 cabins
HELLWIND CANYON	P	H	1 dense flake site, cabin, 1920's car, sheds
LEACH LAKE PLAYA[1]	P	Paleo	Off limits
CHOCOLATE DROPS[1]		Paleo	Wood rat middens
MINI-CANYON[1]		Paleo	Wood rat middens

Note 1: Paleontological sites
Source: (Norwood 1989)

3.4 Earth Resources

3.4.1 Regulatory Setting

Most of the state and federal regulations that cover earth resources apply to minerals and mining. No mining or mineral extraction occurs on Leach Lake Tactical Range or are included in this action so they do not apply. Those that do apply are Air Force Instruction 32-7064, *Integrated Natural Resources Management* (USAF 1997b), Army Regulation 200-3, *Natural Resources—Land, Forest, and Wildlife Management* (DA 1995), and the *Department of the Army Integrated Natural Resources Management Plan* (DA 2003).

3.4.2 Region of Influence

The ROI for geology extends well beyond the boundaries of the Leach Lake Tactical Range as several fault lines transverse the area—these faults either begin and/or end many miles before transversing this area.

3.4.3 Current Environment

3.4.3.1 Geology

Introduction

The Leach Lake Valley is located in the northeast corner of the Mojave Block of the Basin and Range Geologic Province. The Mojave Block is a triangular-shaped region formed by the intersection of the Garlock and San Andreas faults in the west and the Eastern California Shear Zone in the east. The site is not within the seismic hazard zone of the San Andreas fault but the Garlock fault bisects the site. The geology south of the Garlock fault does not appear to be related to geologic activity to the north in the Death Valley region.

The Leach Lake Valley is a closed basin surrounded on the north and south by mountain ranges of low to moderate elevations. The Leach Lake Valley extends west of the Leach Lake Tactical Range boundary with no enclosing mountain range for some distance. The eastern edge of the valley ends in the foothills of the northern Avawatz Range. The Avawatz Range is primarily a north-south trending range that curves west at the northern and southern ends. The northern end of these mountains is within the Leach Lake Tactical Range.

The general geologic makeup of the area is illustrated in Figure 3-1. The majority of the Leach Lake Tactical Range is unconsolidated alluvial deposits. The Granite Mountains form the southern boundary of Leach Lake Valley. They are a steep sloped range primarily made of granite. The Quail and Owlshead Mountains to the northwest have a much more complicated geology. Most of the rocks are felsic metamorphics, dacite, and rhyolite. Only a small portion of the Owlshead Mountains are within the boundaries of the Leach Lake Tactical Range. The hills in the northeast are unnamed foothills of the Avawatz Range. They are made up of clastics such as tuff, metamorphic felsic rocks, and dioritic granite with some unknown fine-grained volcanics. A small basalt flow has been reported from the Quail Mountains.

Stratigraphy

According to Norwood, 10 types of geologic deposits occur in Leach Lake Valley, they are from youngest to oldest (Norwood 1989):

- Quarternary alluvium (these are unconsolidated deposits or soil)
- Quarternary lake deposits (this is the level clay deposits of the lakebed)
- Pleistocene non-marine sediments (these are lake deposits from the ice age precursor to Leach Lake)
- Plio-pleistocene deposits (these are older sedimentary lake deposits)

- Tertiary volcanics (these include the pinkish dacite strata)
- Tertiary rhyolitic volcanic deposits (these are pinkish-purple plugs)
- Tertiary non-marine deposits (these are very old lake and stream deposits)
- Pre-cretaceous metamorphic rocks (these are primarily reheated granitic gneiss)
- Mesozoic granitic type rocks
- Precambrian metamorphic rocks (also gneiss)

Seismicity

The Leach Lake Valley is formed by the Garlock fault zone, one of the most obvious geologic features in Southern California. The Garlock fault is a left-lateral strike slip fault, meaning the surfaces on both sides of the fault are moving in relatively different directions with very little vertical movement. At the eastern end of the fault, the Garlock fault's main trace splits into the Mule Springs (El Paso) fault and the Leach Lake fault (southern trace). Both traces show evidence of surface rupture within the Holocene (last 8,000 years). The Garlock fault is an active major fault system with low, moderate, and active zones between Lebec, California and Leach Lake. Six well-resolved earthquakes have been documented in the last 7,500 years in the central portion of the fault. These occurred between 1640 and 1450 AD, 950 and 675 AD, 475 and 275, 250 and 25 AD, 2930 and 3340 BC, and 4670 and 5300 BC (Dawson et al. 2003).

Detailed studies show 60 meters of horizontal displacement have occurred with very little vertical movement (McGill 1998). Figure 3-2 shows the following faults within the Leach Lake Tactical Range:

- Brown Mountain fault
- El Paso fault
- Garlock fault
- Granite Mountains fault
- Owl Lake fault

The Garlock fault interacts with a fault zone running nearly perpendicular at its eastern terminus. This interaction terminates the Garlock fault and results in it bending south. The Death Valley fault is located within the Eastern California Shear Zone. It forms Silurian Valley in which the town of Baker is located. The uplift of the Avawatz Range was caused by this fault interaction (Reinert 2003). Slip along the Garlock fault began between 12 and 14 million years ago. Right-lateral slip activity along the Death Valley fault may have also begun about 14 million years ago.

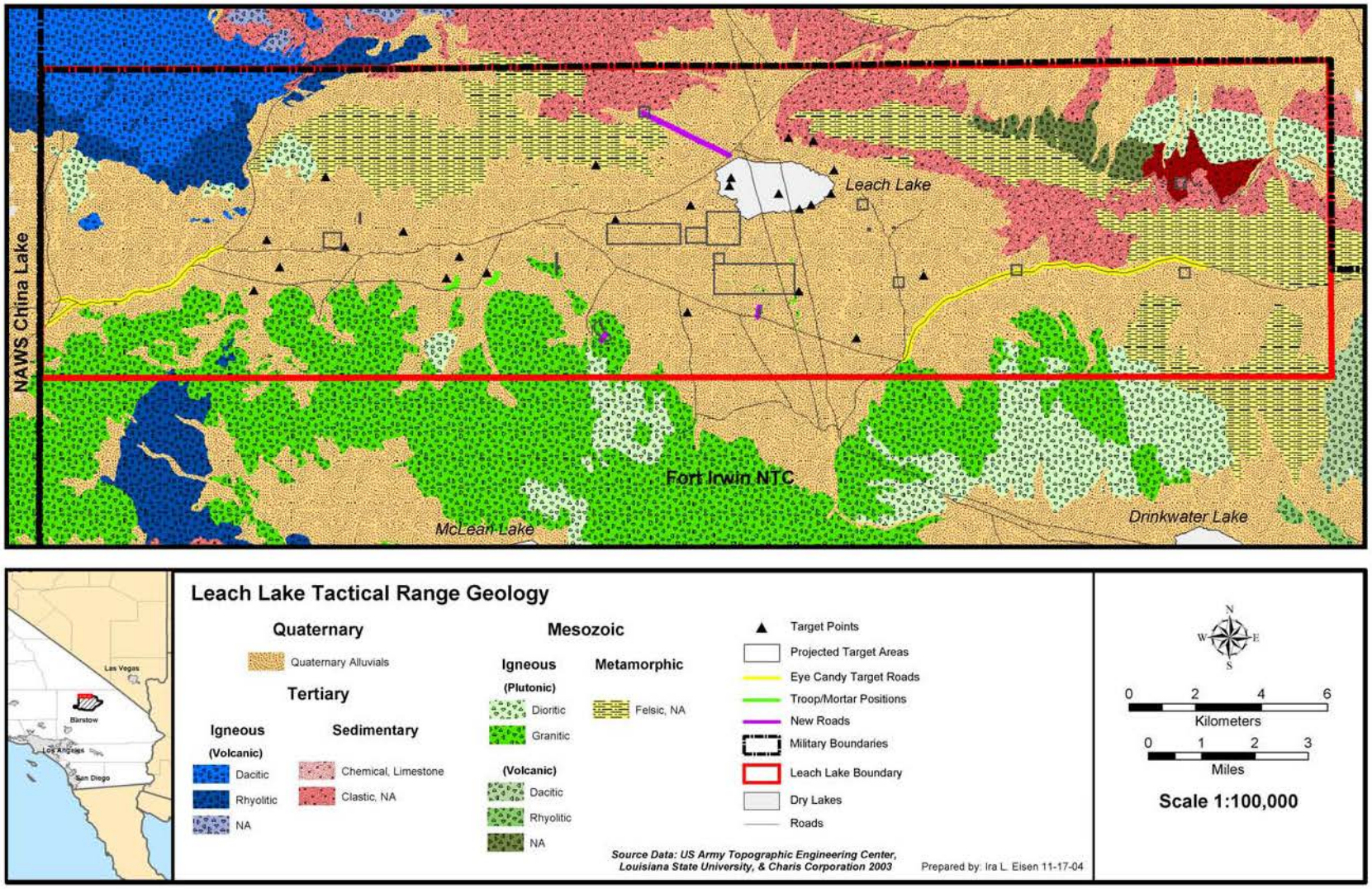

Figure 3-1: Geology

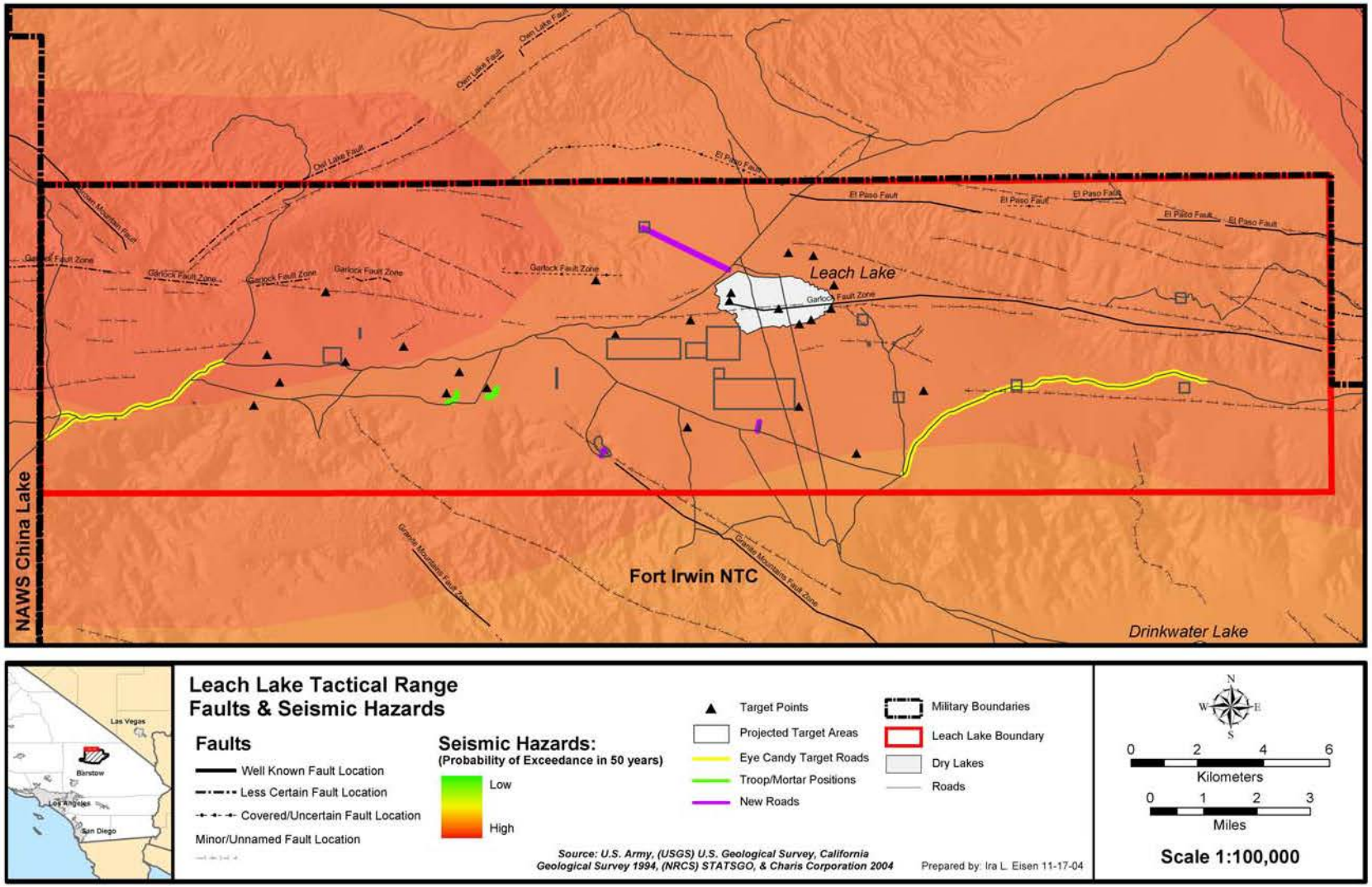

Figure 3-2: Faults and Seismic Hazardous

3.4.3.2 Soils

Mojave Desert soils are poorly developed and their composition is primarily related to the type of adjacent bedrock, topographic relief, and the weather. Most desert soils support only grazing activity. There is no evidence of extensive agriculture in the Leach Lake Valley. Only ranching, associated with the springs, has been documented. Some alfalfa and fruit tree agriculture has occurred in the Mojave River Drainage and date farming occurs in the Amargosa Drainage to the northeast.

Soil Classification

The basic unit described in soil surveys is the soil series. Most desert soils are not described at the series level due to of suitability for use in agriculture. The soil map polygons mapped during the soils surveys that have been completed contain several soil series. Most or all of the soil series within each polygon are described and the percent of the primary soil series within each polygon may be estimated. These polygons are primarily based on mapping of the geomorphology or surface topographic units and not extensive subsurface description. The source of the electronic version of the soils map is the National Resources Conservation Service (NRCS) State Soil Geographic (STATSGO) database (NRCS STATSGO 2004) (Figure 3-3). At least 16 soil series have been documented within the boundaries of the Leach Lake Tactical Range (NRCS STATSGO 2004). These include: Arizo, Bitter, Bitterwater, Cajon, CalVista, Carrizo, Chuckwalla, Gunsight, Glendale, Nickel, Rillito, Rositas, Sparkhule, Tecopa, Upsprings and Victorville Variant. Other less developed "soils" within rock outcrops include: rock outcrop, lithic torriorthenth, and badlands. Playa soils are the clay pans on the dry lakebeds. All are common and widely distributed soil series. Each soil series has an erodibility factor but this number is only for undisturbed soils.

Arizo, Cajon, and Victorville variant soils occur on the valley floor. Cajon and Glendale soils occur near the lakebed. Badland, Bitterwater, Sparkhule, Upspring, and Tecopa soils occur on the alluvial fans and foothills in the Quail and Avawatz Mountains.

Soil Formation

The bedrock in the area is primarily granite. Granite breaks down into sand, clay, and ferromagnesian metals. These form particles of various composition and size, and are transported by wind and water throughout the site. Small quantities of fine-grained parent materials such as rhyolite, limestone, basalt, and dacite also occur in the area. Most of the poorly formed soils in the region are described as unconsolidated recent alluvium, geologically. Old benches of Pleistocene age are apparent in the northern and eastern edges of the Leach Lake Valley.

3.4.3.2.1 Erosion Factors

Various conditions reduce soil erosion in the desert. The soil surface of the Leach Lake Valley contains a variety of scattered surface stone. These stones reduce erosion rates. These rock particles become very dense in the east, forming desert pavement. Hardened soil crusts form on the lakebeds and occasionally on the alluvial fans. These alluvial fan crusts are often the result of biological activity. The crusts are combinations of algae, bacteria, and fungi and are an important element in stabilizing the desert soil surface. These crusts have the depth of a surface film and are known as macrobiotic crusts. They not only resist wind and water erosion but also fix nitrogen. They are easily destroyed by surface traffic. Such crusts are not common in the Leach Lake Valley.

Several desert plant species develop an association between the plants roots and microorganisms during the seedling stage. This relationship is known as a mycorrhizal relationship and this association increases a plant's ability to absorb water, mineral, and non-mineral nutrients. Mycorrhizal relationships are easily broken by intense soil disturbance. Non-native Eurasian exotic weeds are adapted to disturbed soils and will replace native wildflowers after disturbance. Non-native exotics are most common in the target areas in the Leach Lake Valley.

Sparse vegetation, intense rains and wind, large amounts of unconsolidated sand, and low amounts of organic matter result in desert soils being highly susceptible to erosion. Soils may be transported away in disturbed areas leaving them void of soil and/or soil forming materials. Erodibility varies within the various soil series as a result of variations in texture, organic matter, aggregate structure, and slope. Generally, erodibility increases with increasing sand content and decreases with increasing clay content. Clay soils are very susceptible to erosion when the surface is disturbed or when wet. Wet clay soils become plastic and the surface deforms under pressure. Clay soils dampen slowly and dry slowly, so they remain susceptible to deformation much longer than alluvial fan soils.

Wind Erosion

In their natural undisturbed state, most desert soils are resistant to wind erosion. Wind erosion occurs when bare, loose, dry soils are exposed to wind of sufficient speed to cause soil particle movement. This process is accelerated when the natural equilibrium between climate, soils, and vegetation is disturbed.

Soil particles less than 0.84 mm in size are considered erodible by wind. Wind speeds of 21-24 km per hr (13-15 mph) 1 foot above the soil surface may initiate highly erodible conditions. The passage of a vehicle over an erodible surface may provide enough energy to initiate soil erosion. As medium sized particles are detached they enter the wind stream temporarily, but are pulled back by gravity. This may cause the particles to impact and dislodge other particles.

Wind erosion is divided into three hazard classes: slight, moderate, and high. Slight hazard soils contain at least ⅓ rock fragments on the surface of soils with less than 35 percent slope. Moderate erodible soils have clay, silty clay, silty clay loam, clay loam, silt loam, loam, very fine sandy loam, and sandy loam textures. Highly erodible soils have loamy fine sand, fine sand, or sandy soil texture.

Water Erosion

Water erosion is the redistribution and removal of the upper layers of soil by the action of falling rain and/or water flowing over the soil surface. Erosion by water is a natural phenomenon but the removal of the soil's protective layer of vegetation during times of heavy rain greatly increases erosion rates, so that they exceed rates of soil formation. This process is known as accelerated erosion. Accelerated erosion by water may reduce soil quality and the water-holding capacity of many eroded soils (Favis-Mortlock 2002).

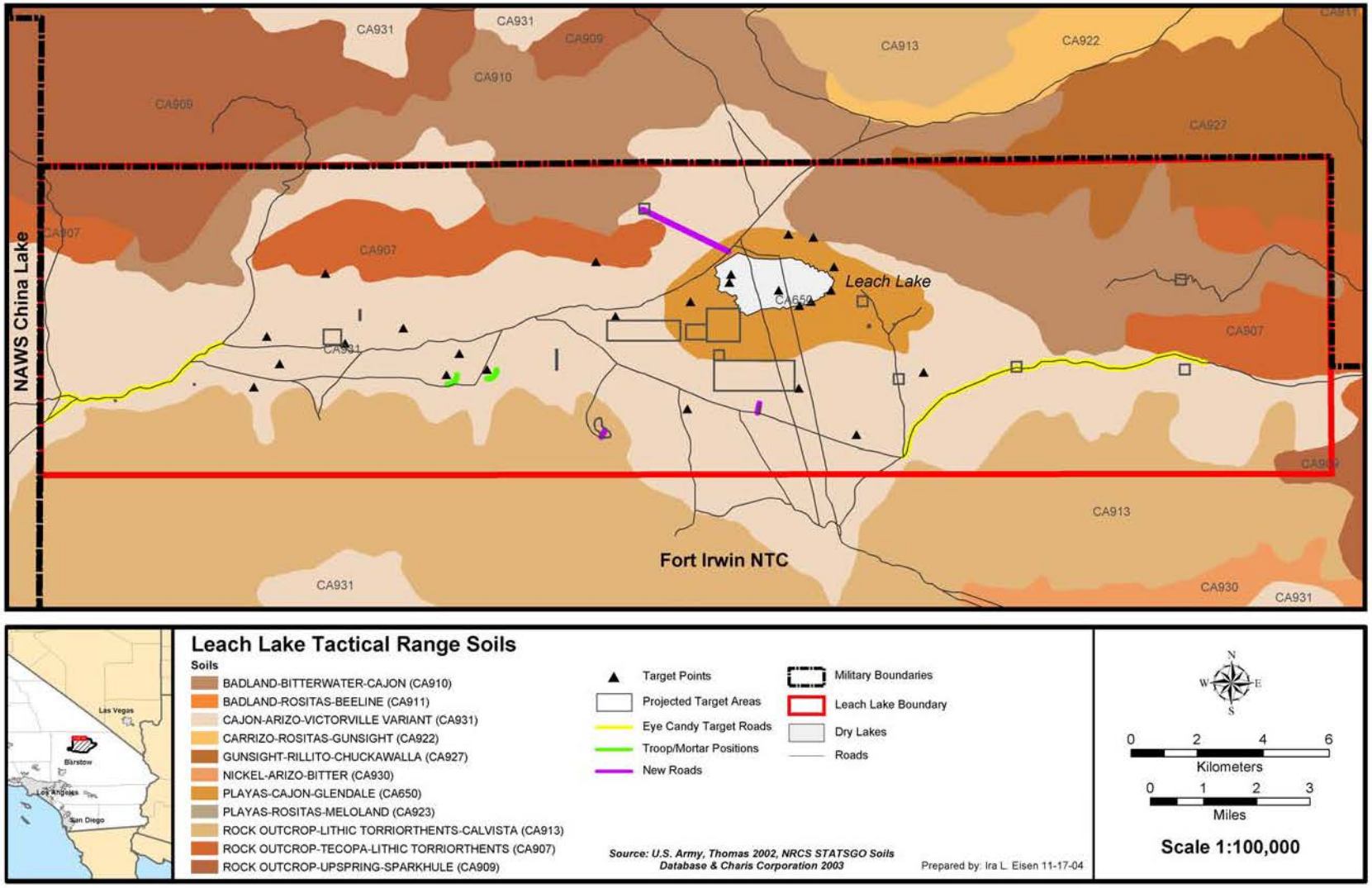

Figure 3-3: Soils

Water erosion would result from surface water deposited by seasonal rain and thunderstorms. Surface water sources within the study area are scarce due to annual average rainfall being approximately 3.87 inches. Washes descending from elevated landforms form intermittent channels that runoff into playas where temporary lakes form. This type of water accumulation occurs about once every 10 years during greater than average precipitation. Without a drainage outlet, surface water in shallow ephemeral lakes is lost though groundwater percolation and/or evaporation (NTC 2005).

For soils eroded by flowing water from the approximately 3.87 inches of annual rainfall, the erosion hazard is divided into three classes: slight, moderate, and high. Slight erosion hazards includes all soil texture classes on slopes less than 4 percent or sandy soils on slopes less than 15 percent. Moderate hazards occur on loamy and clay soils on slopes of 4-15 percent or sandy soils with slopes of 15-30 percent. High erosion hazards exist on soils having loamy soils of 15-30 percent or all soils heavier than loam with slopes over 30 percent.

3.5 Environmental Justice

3.5.1 Regulatory Setting

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* requires that "each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low income populations" (EO 12898).

3.5.2 Current Conditions

There are no minority and/or low-income populations within the Leach Lake Tactical Range boundaries. The proposed action of this project would remain within the currently established boundaries, therefore, no new affects involving environmental justice would occur as a result of this project.

3.6 Hazardous Materials/Waste and Solid Waste

3.6.1 Definition of the Resource

Hazardous materials are defined as any substances that, due to quantity, concentration, physical, chemical, or infectious characteristics, that if released may present substantial danger to public health, welfare, or the environment. Examples of hazardous materials include petroleum, natural gas, synthetic gas, toxic chemicals, and low-level radioactive sources, such as compasses and military vehicle gauges. Hazardous wastes are defined as any solid, liquid, contained gaseous or semisolid waste, or any combination of wastes that either exhibit one or more hazardous characteristic of ignitability, corrosivity, toxicity or reactivity, or are listed as a hazardous waste under the Environmental Protection Agency's (EPA), *Resource Conservation and Recovery Act (RCRA)*. The term "solid waste" is used to define non-hazardous waste and materials resulting from domestic refuse, mining operations, vegetative debris from clearing of land, sewage sludge, and building debris.

3.6.2 Regulatory Setting

Hazardous materials are identified and regulated under the *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980* (42 USC § 9606); the *Solid Waste Disposal Act (SWDA) of 1980* (SWDA 1965); and the *Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986* (42 USC § 11001). Hazardous materials and wastes are federally regulated by the EPA, in accordance with the *Federal Water Pollution Control Act (FWPCA) of 1972* (commonly known as the *Clean Water Act [CWA]*) as amended (33 USC § 1251); the *Toxic Substance Control Act (TSCA) of 1976* (15 USC § 2601); the SWDA as amended (SWDA 1965); the *Resource Conservation and Recovery Act (RCRA) of 1976* (42 USC § 6901); CERCLA as amended (42 USC § 9606); and the *Clean Air Act (CAA) of 1970*, as amended (42 USC § 7401). In California, hazardous materials and substances are regulated under Title 22 of the California Code of Regulations.

Department of Defense Directives (DoDD) and Manuals covering the management of hazardous materials/waste and solid waste include: *Pollution Prevention (DoD 1996b), Hazardous Materials Pollutions Prevention* (DLA 1994), and *Storage and Handling of Hazardous Materials* (DLA 1999).

Air Force Instructions (AFI) and Policy Directives that direct management of hazardous materials/waste and solid waste include: *Disaster Preparedness Program* (USAF 1997a); *Hazardous Materials Management* (USAF 1997c)*; Managing Radioactive Materials in the USAF* (USAF 2000a); and *Pollution Prevention Program* (USAF 1994).

Army Regulations (AR) that apply to hazardous materials/waste and solid waste management include: AR 200-1, *Environmental Protection and Enhancement* (DA 1990).

3.6.3 Current Conditions

Hazardous materials that could possibly be used on Leach Lake Tactical Range include, but are not limited to, petroleum, oil, lubricants, paint, batteries, solvents, thinners, antifreeze, and aerosol containers. Nellis AFB personnel and/or their contractors properly handle, store, use, and dispose of hazardous materials and solid waste in accordance with established directives and procedures. Those persons who would most likely come in contact with hazardous materials would be drivers and maintenance workers. Individuals likely to come in contact with hazardous materials or hazardous waste will be trained for initial response to spills and other incidents. The Nellis Environmental Flight will coordinate all regulatory spill reporting.

The use of live and practice ordnance on Leach Lake Tactical Range generates quantities of target debris, smaller quantities of exploded ordnance debris, ordnance castings, concrete, and UXO. It is estimated that approximately 1.5 million pounds of USAF live ordnance will dropped on the Leach Lake Tactical Range over the next 5 years (personal conversation with Captain Taylor 2004).

Training on the Leach Lake Tactical Range includes bombing targets that are constructed of various materials, such as concrete, plastic, or plywood materials built to resemble military hardware and/or high-value targets. Empty metal cargo containers are assembled to simulate buildings and/or industrial complexes. Salvaged military and civilian equipment (trucks, tanks, aircraft, etc.) are also used as high-fidelity targets. To eliminate environmental contamination, salvaged equipment is demilitarized and de-

fluidized on the NTTR Southern Ranges in accordance with federal, state, and local environmental requirements before siting as targets.

Coronet Clean Operations

The USAF at Nellis AFB contracts with private contractors for range cleanup and target construction on the Leach Lake Tactical Range. Termed "Coronet Clean," these activities are scheduled throughout the year. The contractor employs explosive ordnance disposal (EOD) qualified specialist to ensure range safety for military and other contractor personnel. Prior to cleanup and target construction, EOD military and contractor personnel identify and neutralize UXO in place during Coronet Clean operations. Once detonated, the material then becomes solid waste. Contractor personnel dispose of target debris and range munitions residue in accordance with the Nellis AFB Plan 12 *Solid Waste Management* and AFI 32-7080, *Pollution Prevention Program* (USAF 1994).

3.7 Noise

3.7.1 Definition of the Resource

Noise is usually defined as sound that is unwanted or undesirable because it interferes with speech communication and hearing, or is otherwise annoying. Under certain conditions, noise may cause hearing loss, interfere with human activities, and in various ways may affect people's health and well-being. Noise is perhaps the most identifiable concern associated with aircraft operations. Although many other sources of noise are present in today's communities, aircraft noise is often singled out for special attention and criticism.

Noise may also affect the habits and routines of wildlife in the area. There are many scientific studies regarding the effects of noise on wildlife and some anecdotal reports of wildlife "flight" due to noise. Few of the studies or reports include any reliable measures of the actual noise levels involved. However, in the absence of definitive data on the effects of noise on animals, the Committee on Hearing, Bioacoustics, and Biomechanics of the National Research Council (NRC) has proposed that protective noise criteria for animals be taken to be the same as for humans (NRC 1977).

3.7.1.1 Representations of Noise

Noise is represented by a variety of quantities or "metrics." Each noise metric was developed to account for the type of noise and the nature of what may be exposed to the noise. Human hearing is more sensitive to medium and high frequencies than to low and very high frequencies, so it is common to use "A-weighted" metrics, which account for this sensitivity. Impact of impulsive noise depends on factors other than human hearing, so it is often quantified by "C-weighted" metrics, which are flat over a broad frequency range.

Different time periods also play a role. People hear the sound that occurs at a given time, so it is intuitive to think of the instantaneous noise level, or perhaps the maximum level that occurs during an aircraft flyover. However, impact over a period of time depends on the total noise exposure over extended periods, so "cumulative" noise metrics are used to assess the impact of on-going activities such as those that occur in Military Operations Areas (MOAs). Within this EA, noise is described by the sound level (L), the

maximum sound level (L_{max}), the Sound Exposure Level (SEL), and Day-Night Average Sound Level (L_{dn}).

Sound Level

Sound level (L) is the amplitude of the sound that occurs at any given time. Some of the sounds are continuous or long term averages (e.g., garbage disposal; rural and urban ambient), and some are maximum levels (e.g., aircraft and truck passbys). Sound levels are measured in decibels, and are reflected on a logarithmic scale. A 3-decible (dB) increase reflects a doubling in sound level. However, due to the way the human ear responds to noise, it actually requires about a 10-dB increase to be perceived as a doubling in noise. It should also be noted that an "instantaneous" level as used in environmental analysis usually represents sound averaged over some short time period, typically one second for slowly changing sounds and ⅛ second for fast-changing sounds. When an aircraft flies by, the noise level changes continuously. It begins at the ambient (background) level, increases to a maximum as the aircraft passes closest to the receiver, then falls back to ambient as the aircraft recedes into the distance.

Maximum Sound Level

Maximum sound level (L_{max}) is the highest instantaneous sound level measured during a single noise event, such as an aircraft overflight. The maximum sound level is important in judging whether a noise event would interfere with conversation, sleep, or other common activities.

Sound Exposure Level

While L_{max} is commonly viewed as an indication of how intrusive a noise event is, impact also depends on how long a sound lasts. A sound that lasts a long time would be more intrusive than one that is over quickly. Sound Exposure Level (SEL) combines both of these characteristics (maximum sound and duration) into a single metric. Sound Exposure Level does not directly represent the sound level heard at any given time, but rather provides a measure of the total exposure of the entire event. For this reason, it is a better indicator of impact than just L_{max}.

Day-Night Sound Average Level

Day-Night Sound Average Level (L_{dn}) is a composite metric combining the levels and duration of individual events, and the number of events that occur over an extended time period. Mathematically, it is a long-term average, but because it incorporates all noise events it is referred to as a *cumulative* metric. It is computed over a specific period of time, commonly a year, to represent the total noise exposure. Because noise is more intrusive at night than during the day, sounds that occur after 10:00 PM and before 7:00 AM are adjusted by a 10-dB penalty.

Studies have shown that L_{dn} represents adverse effects of noise much more reliably than individual noise levels alone. As noted above for SEL versus L_{max}, L_{dn} is not the sound level heard at any given time, but is the best measure of long-term cumulative impact.

For military airspaces, there are two important variations of L_{dn} that account for special characteristics of military aircraft noise, described below.

3.7.1.2 Noise Modeling

Prediction of aircraft noise requires two elements. The first is a quantitative understanding of aircraft operations: types and altitudes. The second element is physical modeling of the noise itself, which is then accumulated over all operations. *Aircraft Operations* below describes operations on the range, from the perspective of noise analysis. Noise modeling is described in the paragraph titled *Subsonic Aircraft Noise Modeling*.

Aircraft Operations

Air Warrior flight operations generally originate at Nellis AFB, Nevada. Aircraft transition at high altitude from Nellis AFB into the Shoshone and Panamint MOAs. They then enter the range upon arrival or hold in the MOAs until cleared into the range. The types and altitudes used by participating aircraft that have taken part in Air Warrior activities in the Leach Lake Tactical Range are listed in Table 3-6. The airspace over the Leach Lake Tactical Range is categorized as Restricted Airspace (R-2503N). Pilots operating within this airspace are allowed to operate from the surface to the altitude limitations of the aircraft. The altitudes listed for each specific aircraft in Table 3-6 are normal operating altitudes, not altitude restrictions.

Subsonic Aircraft Noise Modeling

Within the Leach Lake Tactical Range flight often occurs randomly, or, due to either airspace configuration or training scenarios, it may be spatially concentrated, or channeled, into specific areas or corridors. The Air Force has developed the MOA Range NoiseMAP (MR_NMAP) computer program to calculate noise in these areas. The acoustic portion of the model is based on the Air Force's NoiseMAP technology, which is the standard method of analyzing military aircraft noise. NoiseMAP can calculate noise for both random operations and operations channeled into corridors (Lucas and Calamia 1996).

Table 3-6: Aircraft Participation

AIRCRAFT TYPES	NORMAL OPERATING ALTITUDES	SEL
A-4	15,000 – 25,000 ft MSL	46.3
A-10	15,000 – 25,000 ft MSL	61.6
A-10	500 – 5,000 ft AGL*	101.8
AV-8B	15,000 – 25,000 ft MSL	61.8
B-1	15,000 – 25,000 ft MSL	77.6
B-52	15,000 – 25,000 ft MSL	61.4
C-130	15,000 – 25,000 ft MSL	64.0
CH-47	100 –1,000 ft AGL	92.2
E-8C	15,000 – 25,000 ft MSL	Not Available
F-14	15,000 – 25,000 ft MSL	55.2
F-15E	15,000 – 25,000 ft MSL	59.9
F-16	15,000 – 25,000 ft MSL	66.0

AIRCRAFT TYPES	NORMAL OPERATING ALTITUDES	SEL
F-18	15,000 – 25,000 ft MSL	60.6
GR-04	15,000 – 25,000 ft MSL	Not Available
MH-60	100 –1,000 ft AGL	87.4
RQ-1	15,000 – 25,000 ft MSL	Not Available

** Approximately 10 to 20 percent of the A-10 sorties operate from 500 to 5,000 ft AGL.*

NOTES: (1) Noise calculations were made assuming the receptor directly beneath the aircraft at power settings most closely associated with operational conditions.
(2) Assuming an average 2,000 ft MSL within the Leach Lake area, aircraft altitudes were adjusted to 13,000 ft AGL for the noise calculations.
(3) Noise calculations were made using a 12-month average high temperature of 99° F and 32 percent average high relative humidity.

Source: (USAF 2001a)

3.7.2 Current Conditions

The USAF at Nellis AFB currently conducts military training on the Leach Lake Tactical Range. This activity includes low flying jet and helicopter aircraft. The Leach Lake Tactical Range is used for combat tactics training and live weapons delivery, all of which produce noise. There is no permanent population in this area, which limits human noise receptors. The closest population center is Baker, California, approximately 26 nautical miles southeast of the range's most southeastern corner. The Avawatz Mountain Range lies between the town of Baker and the Leach Lake Tactical Range, and acts as a sound barrier to the noise produced within the range.

The other non-human noise receptors on the Leach Lake Tactical Range are the wildlife that are found on the valley floor and surrounding foothills. Operational noise impacts on these receptors would continue at the current level; construction noise would be similar to the range cleanup and target re-building activities that currently take place during Coronet Clean operations.

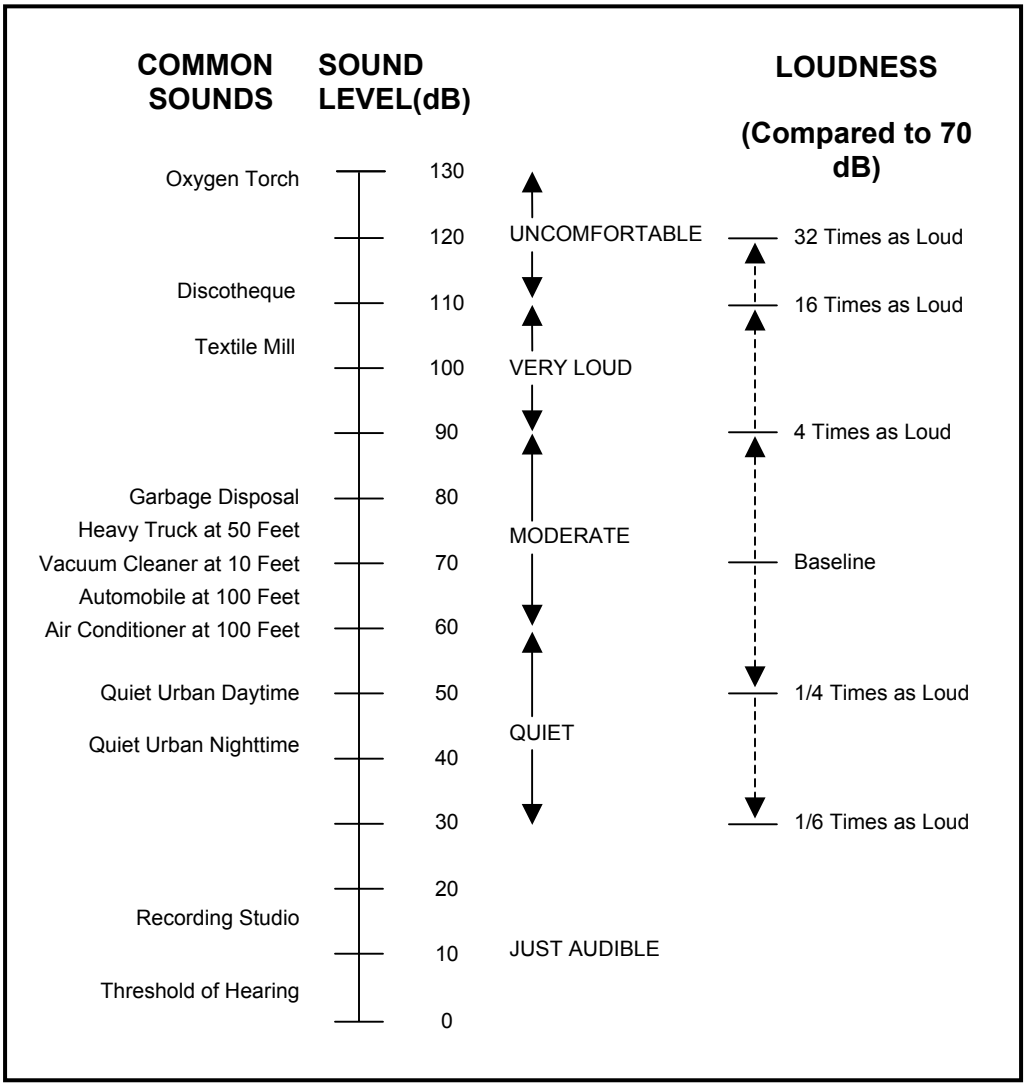

Figure 3-4: Typical A-Weighted Sound Levels of Common Sounds

* *Approximately 10 to 20 percent of the A-10 sorties operate from 500 to 5,000 ft AGL.*

NOTES: (1) Noise calculations were made assuming the receptor directly beneath the aircraft at power settings most closely associated with operational conditions.
(2) Assuming an average 2,000 ft MSL within the Leach Lake area, aircraft altitudes were adjusted to 13,000 ft AGL for the noise calculations.
(3) Noise calculations were made using a 12-month average high temperature of 99º F and 32 percent average high relative humidity.

Source: (USAF 2001a)

3.8 Safety

This section addresses ground, flight, and range safety associated with activities conducted on the Leach Lake Tactical Range. Ground Safety includes fire and crash response. Flight Safety considers aircraft flight risks such as aircraft accidents and bird-aircraft strike hazards. Range safety assesses the management and use of ordnance or munitions associated with range use and cleanup.

3.8.1 Regulatory Setting

The regulatory setting for safety within the Leach Lake Tactical Range comes under numerous regulatory and instructional sources. Samples of the various sources are: DoDI 6055.7, *Accident Investigation, Reporting, and Record Keeping* (DoD 2000); AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program* (USAF 1996) and Series 91 Safety Instructions; and Air Combat Command (ACC) Series 91 Safety Instructions and supplements to USAF Safety Instructions; AR 385-10, *Army Safety Program* (DA 2000a); and AR 385-64, *Army Explosives Safety Program* (DA 2000b).

3.8.2 Current Conditions

3.8.2.1 Ground Safety

Ground Fires

Fire protection for the Leach Lake Tactical Range is provided by the NTC as outlined by an Interservice Support Agreement (ISA). As stated in the ISA, the NTC will, "Provide limited fire fighting support at Leach Lake Tactics Range (LLTR) when available." The Weapons and Tactics Center (WTC) at Nellis will in return, "Reimburse the [NTC] for any costs billed by outside agencies (i.e. BLM) to fight fires attributed to [WTC] use of LLTR." (WTC and NTC 1993)

Crash Response

The Disaster Control Group (DCG), directed by the 57th Wing at Nellis AFB maintains detailed mishap response procedures, as outlined in Nellis AFB Plan 19-1, *Facility Response Plan* (FRP), to respond to a wide range of potential incidents. The FRP assigns agency responsibilities and prescribe functional activities necessary to react to major mishaps. Response will normally occur in two phases. The initial response considers such factors as rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. Subsequently, the investigation phase is accomplished.

The initial response element consists of those personnel and agencies primarily responsible for beginning the initial phase. This element includes the Fire Chief (who normally is the first on-scene commander), fire fighting and crash rescue personnel, medical personnel, security police, and crash recovery personnel. A subsequent response team is comprised of an array of organizations, including the 99 CES Environmental Flight, whose participation is governed by the circumstances associated with the mishap and actions required to be performed.

If an aircraft accident occurs on non-federal property, regardless of the agency initially responding to the situation, as soon as the situation is stabilized, a National Defense Area would normally be established around the accident scene and secured for the investigation phase.

After all required investigations and related actions on the site are complete, the aircraft would be removed. The 99 CES Environmental Flight will coordinate with environmental regulators as required during the spill and clean-up process.

Overall, the purpose of the response planning is to:

- save lives, property, and material by timely and correct response to mishaps;
- quickly and accurately report mishaps to MAJCOM and all federal, state, and local regulators; and
- investigate the mishap to preclude the reoccurrence of the same or similar mishap.

3.8.2.2 Flight Safety

Aircraft Accidents/Mishaps

Aircraft flight operations on the Leach Lake Tactical Range are governed by standard flight rules. Additionally, specific procedures applicable to local operations are continued in detailed standard operating procedures that must be followed by all aircrews operating from the installation (USAF 2002).

The Air Force defines four categories of aircraft accidents/mishaps: Classes A, B, C, and High Accident Potential (HAP). Class A accidents result in the total cost of damages to government and other property in the amount of $1 million or more; a DoD aircraft is destroyed; or an injury and/or occupational illness results in a fatality or permanent total disability. Class B accidents result in the total cost of damage in the amount of $200,000 or more, but less than $1 million; an injury and/or occupational illness results in permanent partial disability; or when three or more personnel are hospitalized for inpatient care as a result of a single accident. Class C accidents result in the total cost of property damage is $20,000 or more, but less than $200,000; a nonfatal injury that causes any loss of time from work beyond the day or shift on which it occurred; or a nonfatal occupational illness or disability that causes loss of time from work or disability at any time (DoD 2000). A HAP represents a significant aircraft, missile, space, explosives, miscellaneous air operations, or ground occurrences with a high potential for causing injury, occupational illness, or damage if they recur (USAF 2001b). Class C accidents and HAPs, the most common types of occurrences, represent relatively unimportant incidents because they generally involve minor damage and injuries, and rarely affect property or the public. This EA will focus on Class A accidents because of their potentially catastrophic results.

It is impossible to predict the precise location of an aircraft accident. Major considerations in any accident are loss of life and property damage. The aircrew's ability to exit a malfunctioning aircraft is dependent on the type of malfunction encountered. The probability of an aircraft crashing into a populated area is extremely low, but it cannot be totally discounted. Several factors are relevant: the ROI and immediate surrounding ar-

eas have relatively low population densities; pilots of aircraft are instructed to avoid direct overflight of population centers at very low altitudes; and the limited amount of time the aircraft is over any specific geographic area limits the probability that impact of a disabled aircraft in a populated area would occur.

Secondary effects of an aircraft crash include the potential for fire and environmental contamination. The extent of these secondary effects is situationally dependent, and is therefore difficult to quantify. The terrain overflown in the ROI is diverse. For example, should a mishap occur, highly vegetated areas during a hot, dry summer would have a higher risk of experiencing extensive fires than would more barren and rocky areas during winter. When an aircraft crashes, it may release hydrocarbons. The petroleum, oil, and/or lubricants not consumed in a fire could contaminate soil and water. The potential for contamination is dependent on several factors. The porosity of the surface soils would determine how rapidly contaminants are absorbed. The specific geologic structure in the region would determine the extent and direction of the contamination plume. The locations and characteristics of surface and groundwater in the area would also affect the extent of contamination to those resources.

F-16 aircraft carry small quantities of hydrazine in a sealed canister as part of the emergency power unit system. Hydrazine is a highly volatile propellant that contains toxic elements. When used for its intended purpose, hydrazine is completely consumed, and poses no safety hazard. The sealed hydrazine canister is designed to survive most crash impacts; however, in a crash that is severe enough to rupture the canister, it is most likely that fire would also be involved. In this case, the hydrazine would also burn and be completely decomposed. In the unlikely event that the hydrazine should be released, but not consumed by fire, impacts on soils and groundwater are likely to be of minor consequence. Hydrazine absorbs water at room temperature. It is incombustible in solution with water at concentrations of 40 percent or less, and it evaporates at any given temperature at a rate slightly slower than water evaporation. Movement of hydrazine through natural soils has been shown to be slow and limited. Due to its absorption and natural decomposition processes, the probability of released hydrazine significantly contaminating groundwater is considered extremely low.

Bird-Aircraft Strike Hazards

In 2000, the Federal Aviation Administration (FAA) did an in depth study of the occurrence of wildlife (including bird) strikes to civilian aircraft in the United States from 1990 to 1999 (FAA 2000). The study analyzed 28,150 reports of wildlife strikes, including 20,893 in which the altitudes of the strikes were indicated. The FAA study found that 74.8 percent of strikes occurred under 600 ft AGL; 95.7 percent under 5,000 ft AGL; and 99 percent under 10,000 ft AGL. Ninety-six percent of bird strikes occurred during the takeoff/climb, and/or descent/approach/landing roll phases of flight.

Between 1990 and 1999, 2,516 known bird strikes were reported in California. This equated to almost 10 percent of all bird strikes reported for this period throughout the United States, Puerto Rico, and the U.S. Virgin Islands. There is no further breakdown of this data to airport locations. National Transportation Safety Board aircraft accident data from 1983 to 2003 were searched to identify those accidents involving bird strikes (NTSB 2003). This database contains no accidents involving bird strikes in the Fort Irwin area.

Nellis AFB maintains Bird-Aircraft Strike Hazardous (BASH) data for the aircraft that operate from Nellis AFB. Records indicate that approximately 80 percent of reported BASH incidents have no specific location indicated. Most BASH incidents were detected on post-flight aircraft inspections. For those incidents without specific locations indicated, pilots could only verify that the incident occurred sometime after takeoff and before landing. A records search for the past 5 years revealed no BASH incidents within the Leach Lake Tactical Range (personal conversation with Captain Bass 2004).

3.8.2.3 Range Safety

Coronet Clean

The Government Contractor employs EOD qualified specialist to ensure range safety for military and contractor personnel. Prior to target cleanup and target construction (Coronet Clean Operations), EOD contractor personnel identify and detonate in place any UXO found in the area. After the UXO has been detonated, the target debris and munitions residue is collected and disposed of in accordance with established procedures. Contractor personnel are responsible to follow and adhere to USAF safety regulations, instructions, and guidelines, and for reporting safety related accidents/incidents.

Currently, the north entrance to the range has a gate but no fence depicting the range boundaries or boundary signs to warn the public that they are restricted from entry (there is a warning sign at the entry gate). This deficiency detracts from range security and public safety.

3.9 Socioeconomics

3.9.1 Regulatory Setting

A central requirement of NEPA is to determine impacts, in advance, where actions of a federal agency may alter the ways in which people live, work, play, relate to one another, organize to meet their needs, and generally cope as members of society. Such socioeconomic impacts must be evaluated where the federal government may take "actions significantly affecting the quality of the human environment" (42 USC § 4321 and USAF 2003).

3.9.2 Current Conditions

There are no permanent facilities or full-time workers on, or assigned to, the Leach Lake Tactical Range. All workers on the range are active duty military, government civilians, or government contractors. When performing official duties on the range, workers travel on a daily basis from Nellis AFB, Ft Irwin, or from temporary quarters in nearby towns (primarily Pahrump, Nevada, to the north east of and approximately 90 minutes travel from the range).

3.10 Water Resources

3.10.1 Definition of the Resource

Three springs are located within the Leach Lake basin and Tactical Range boundaries. All springs—Leach Spring, Hell Wind Canyon Spring, and Two Springs, are located at or near the boundaries of the basin. One additional spring is located approximately 1½

miles south of the southern range boundary—Desert King Spring, with another two springs located less than a mile outside the northern range boundary—Quail Spring and Owl Hole Spring. Finally, Denning Spring is located approximately 1½ miles east of the eastern range boundary. None of the springs within or near the basin generate sufficient flows to sustain perennial surface watercourses.

3.10.2 Regulatory Setting

Federal and state regulatory documents that apply to this action include the *Federal Water Pollution Control Act of 1972* (33 USC § 1251), commonly referred to as the Clean Water Act and the *Water Quality Act of 1987* (33 USC 1251 *et seq.*), which amended the Clean Water Act.

3.10.3 Region of Influence

Leach Lake is a dry lakebed enclosed on all sides by mountainous terrain. All rainfall and storm runoff is contained within the Leach Lake basin where is percolates to groundwater or is lost to evaporation. Hydrologically, Leach Lake is a closed system. There are no navigable waters of the United States within the Leach Lake basin nor does runoff in the general region reach any navigable waters. Groundwater of the Leach Lake basin is not used for potable or fodder crop irrigation purposes.

3.10.4 Current Conditions

The waters of the springs within and outside the boundaries of the Leach Lake Tactical Range do not reach Leach Lake. The only water to reach Leach Lake would be the stormwater from infrequent thunderstorms. None of the water that flows into Leach Lake leaves the basin or flows into the navigable waters of the United States. There are no springs within the project areas.

Chapter 4 – Environmental Consequences

Consistent with the discussion of the affected environment (Section 3), this chapter has been divided into resource sections to provide a comparative framework for evaluating the potential impacts on individual resources of the Proposed Action and No Action Alternative.

4.1 Air Quality

Significant air quality impacts are defined as those that cause, or contribute to, an exceedance of federal and/or state ambient air quality standards. The MDAQMD has established daily and annual threshold levels to attain or prevent exceedance of federal and state ambient air quality standards. The criteria in this section are any negative, unmitigated impacts on air quality that rise to the level of significant. No special air quality permits are required; however, construction must comply with MDAQMD Rule 403.2, *Fugitive Dust Control for the Mojave Desert Planning Area* (MDAQMD 1996) and the *NTTR Facility Wide Fugitive Dust Control Plan* (NTTR 2003).

4.1.1 Proposed Action

4.1.1.1 Aircraft Operations

Under the Proposed Action, there would be no significant changes to aircraft flying and/or training operations. Normal aircraft operating altitudes are well above the mean average mixing altitude of approximately 5,280 ft MSL (approximately 3,280 ft AGL) (paragraph 3.1.3.1). The emissions generated by the small percentage of aircraft that may temporally operate below the mixing altitude.

4.1.1.2 Construction Operations

The primary air quality issue pertaining to this project is fugitive dust commonly referred to as PM_{10}. The PM_{10} generated from the Proposed Action would primarily be caused by blading the construction areas (where required) to level site surfaces and remove vegetation. Any PM_{10} generated as a result of implementing the Proposed Action would be of short duration (lasting through construction) and isolated to defined areas (at and immediately adjacent to the construction sites). An average of 431 pounds of PM_{10} are generated for each hour of blading (MDAQMD 2000). Range managers estimate it would take approximately 1 hour to blade each acre of undisturbed area; therefore approximately 431 pounds of PM_{10} would be generated for 1 acre of new target area. The approximate amount of PM_{10} generated as a result of implementing the Proposed Action is defined in Table 4-1 below, defined per target.

Table 4-1: PM_{10} Generation

AREA	TARGET	GRADED ACRES	GRADING HOURS	PM_{10} (TONS)
A	66-34	0	0	0
	66-36	0	0	0
B	66-20	0	0	0
	66-21	0	0	0

AREA	TARGET	GRADED ACRES	GRADING HOURS	PM10 (TONS)
	66-22	0	0	0
C	66-23	0	0	0
	66-24	0	0	0
D	66-25	23	23	4.96
	66-26	23	23	4.96
	66-27	23	23	4.96
	66-28	23	23	4.96
	66-30	23	23	4.96
E	66-03	4.6	4.6	1.0
	66-06	2.3	2.3	.5
F	66-04	5	5	1.08
	66-05	5	5	1.08
H	66-02	60	60	12.94
I	66-01	0	0	0
J	66-31	0	0	0
K	66-33	23	23	4.96
L	OP	.2	.2	.04
M	66-35	1	1	.22
N	OP	0	0	0
FENCE	0	0	0	0
Totals		**216.1**	**216.1**	**46.6**

Source: (MDAQMD 2000; personal conversation with Roger Schofield 2004)

The potential drift distance of particles is governed by the initial injection height of the particle, the terminal settling velocity of the particle, and the degree of atmospheric turbulence. Theoretical drift distance, as a function of particle diameter and mean wind speed, has been computed for fugitive dust emissions. Results indicate that, for a typical mean wind speed of 10 mph, particles larger than about 100 micrometers (µm) are likely to settle within 20 to 30 feet from the edge of the road or other point of emission. Particles that are 30 to 100 µm in diameter are likely to undergo impeded settling, depending upon the extent of atmospheric turbulence, to within a few hundred feet from the road or other point of emission. Smaller particles, particularly PM_{10}, have much slower gravitational settling velocities and are much more likely to have their settling rate retarded by atmospheric turbulence (EPA 1995).

The typical regional winds in the Leach Lake Tactical Range area have an average speed of approximately 15 mph from the southwest as monitored at Four Corners—a monitoring station located in the center of Fort Irwin (NTC 2005). Based on this climatic data, Target 66-25 would pose the greatest threat of PM_{10} migrating beyond the Leach

Lake Tactical Range boundaries. Target 66-25 is located north west of Leach Lake, approximately ¾ mile south of the northern boundary. The PM_{10} generated from all proposed construction projects is expected to remain within the boundaries of the Leach Lake Tactical Range. Additionally there are no human receptors sensitive to PM_{10} within, or immediately adjacent to, the northern boundaries of the Leach Lake Tactical Range. The environmental impacts of construction operations are considered less than significant; however, to minimize the creation of PM_{10}, the following mediation measures will be taken where reasonable, appropriate, and practicable:

- water spraying will be used to wet the exposed dirt in the construction sites
- blading activities will be minimized when surface winds exceed 25 MPH
- where possible, heavy construction vehicle speeds will be kept to below 15 MPH

In addition, the range contractor will follow and comply with the *NTTR Facility Wide Fugitive Dust Control Plan* (NTTR 2003).

The range contractor is expected to use the following diesel-powered construction vehicles during new target construction activities: two road graders, two front-end loaders, and two tractor-trailers for an average 6 hours per day for 30 days per year; and two fuel trucks for an average 1 hour per day for 30 days per year. The estimated emissions from these construction vehicles are outlined in the Table 4-2 below. These amounts of pollutants are well below *de minus* levels.

Table 4-2: Construction Equipment Emissions

VEHICLE TYPE	TOTAL HRS/YR	CO (LBS)	NX (LBS)	SO_2 (LBS)	PH_{10} (LBS)
GRADERS	360	54.4	256.7	40.0	22.0
FRONT-END LOADERS	360	72.4	297.7	27.4	20.9
TRACTOR-TRAILERS	360	645.8	1,499.8	163.4	92.2
FUEL TRUCKS	30	20.3	50.7	4.3	4.2
TOTALS (LBS/ YEAR)		**793**	**2,105**	**235**	**139**

Source: (MDAQMD 2000; personal conversation with Roger Schofield 2005)

4.1.2 No Action Alternative

4.1.2.1 Aircraft Operations

Under the No Action Alternative, there would be no changes to current flying and/or training operations. There would be no adverse impacts to air quality as a result of selecting the No Action Alternative.

4.1.2.2 Construction Operations

Under the No Action Alternative, there would be no changes to current construction/maintenance operations. There would be no adverse impacts to air quality as a result of selecting the No Action Alternative.

4.2 Biological Resources

The effects of this project would be considered significant if there is a loss or degradation of rare or sensitive species or habitat, loss of federal or state listed individuals or populations, a substantial loss of natural vegetation that is slow to recover, or substantial loss in diversity in vegetation and wildlife habitat. Most desert ecosystems are low in diversity and slow to recover after disturbance.

Wildlife

Leach Lake Valley contains wildlife species typical of the Mojave Desert. Three days of field surveys were conducted in October and November. The most commonly observed wildlife species were birds and insects. The most commonly observed bird species were black-throated sparrows (*Amphispiza bilineata*) and ravens (*Corvus corax*). Antelope ground squirrels (*Ammospermophilus leucurus*), kangaroo rat (*Dipodomys sp*.) sign, and burros (*Equus asinus*) were also observed. Harvester ants (*Pogonomyrmex sp*.) were active during the afternoon and a few painted lady butterflies (*Vanessa sp.*) were observed. A wildlife list was not made, although the following species were observed: at least 26 burros, antelope ground squirrels, ravens, sparrows, harvester ants, and painted lady butterflies.

Plants

The scrub community within Leach Lake Valley is not very diverse and is dominated by creosote bush (*Larrea tridentata*) and burrobush (*Ambrosia dumosa*). Golden cholla (*Opuntia echinocarpa*) is the most common subdominant with desert senna (*Senna armata*) being common in the transition with desert wash scrub. Desert senna is normally a wash species but is more common on bajadas adjacent to braided washes. Approximately 10 annual species were identified from skeletons. Only three types of plants were observed in flower: fall blooming shrubs, summer annuals, and a spring flowering shrub that responded to recent summer rainfall.

The saltbush scrub on and adjacent to Leach Lake is dominated by allscale (*Atriplex polycarpa*). No other saltbush species were observed in this community because very little surveying could be done due to the high amount of unexploded ordinance near the lakebed.

Desert wash scrub is common in Leach Lake Valley. The most common species on the northern flowing drainages, in the south, is cheesebush (*Hymenoclea salsola*). Other species observed in the washes were desert senna and California tea (*Ephedra californica*). The main wash in the west is in Alpine Valley and the main wash in the east is Desert King wash. A much more diverse community occurs on the east-west flowing drainage in the central portion of the valley. Vegetation here includes black-banded rabbitbrush (*Chrysothamnus paniculatus*) and sandpaper plant (*Petalonyx thurberi*). Much of this wash has been used as a road and is largely unvegetated.

The rocky hillsides and boulder piles located in the south contain a very diverse Mojave mixed woody scrub vegetation. This vegetation occurs on steep to vertical rocky slopes. Shrubs and perennials grow in the canyons, rock cracks, and crevices formed by the exfoliating granite. The project will not impact this plant community, as construction would be expensive and extremely difficult. Plant species observed in this and past surveys

include Mojave aster (*Xylorhiza tortifolia*), California bush buckwheat (*Eriogonum fasciculatum polifolium*), brickel bush (*Brickellia arguta*), round-leaf rabbitbrush (*Chrysothamnus teretifolius*), and perennial grasses such as desert needle grass (*Achnatherum speciosa*).

The alkaline meadow plant community occurs at the springs within Leach Lake Valley. Two Springs, Hellwind Canyon, and Leach Springs will not be directly impacted by this project. Leach Springs, in the southwest, contains arboreal elements such as Fremont cottonwood (*Populus fremonti*) and willow (Salix sp.). Two Springs, in the southeast, contains a large clump of mesquite (*Prosopis glandulosa*), and an alkaline meadow that is dominated by Mexican wire grass (*Juncus balticus*) and rabbits foot grass (*Polypogon monspeliensis*). A sensitive plant species alkali mariposa lily (*Calochortus striatus*) is known from the alkaline meadow at Two Springs. Heavy vegetation damage from wild burros was observed. Each spring supports at least 15 burros. The only other plant species observed in flower during the initial field survey was blunt-leaved stinkweed (*Cleomella obtusifolia*) at the lower end of the springs near the road.

Table 4-3: Shrub List

SPECIES	COMMUNITY	OBSERVED OCCURRENCE
Allscale (*Atriplex polycarpa*)	Saltbush Scrub	Common
Beavertail cactus (*Opuntia basilaris*)	Creosote Bush Scrub	Rare
Black banded rabbitbrush (*Chrysothamnus paniculatus*)	Desert Wash Scrub	Uncommon
Burrobush (*Ambrosia dumosa*)	Creosote Bush Scrub	Very Common
California bush buckwheat (*Eriogonum fasciculatum*)	Mojave Mixed Woody Scrub	Rare
California tea (*Ephedra californica*)	Desert Wash Scrub	Uncommon
Cheesebush (*Hymenoclea salsola*)	Desert Wash Scrub	Common
Creosote Bush (*Larrea tridentate*)	Creosote Bush Scrub	Very common
Desert senna (*Senna armata*)	Creosote Bush Scrub	Fairly common
Desert tomato (*Lycium andersonii*)	Creosote Bush Scrub	Uncommon
Golden cholla (*Opuntia echinocarpa*)	Creosote Bush Scrub	Fairly common
Joshua tree (*Yucca brevifolia*)	Mojave Mixed Woody Scrub	Rare

Mojave aster (*Xylorhiza tortifolia*)	Mojave Mixed Woody Scrub	Rare
Peachthorn (*Lycium cooperi*)	Creosote Bush Scrub	Uncommon
Sandpaper plant (*Petalonyx thurberi*)	Desert Wash Scrub	Rare
Turpentine broom (*Thamnosma montana*)	Creosote Bush Scrub	Uncommon

The following annuals were also observed:

- Annual desert spurge (*Chamaesyce micromeria*)
- Blunt-leaved Stinkweed (*Cleomella obtusitolia*)
- Brittle spineflower *(Chorizanthe brevicornu)*
- Brown-eyed evening primrose *(Camissonia claviformis)*
- Chia sage (*Salvia columbariae*)
- Cinchweed *(Pectis papposa)*
- Fremont pincushion flower *(Chaenactis fremontii)*
- Royal lupine *(Lupinus odoratus)*
- Split grass *(Schismus barbatus)*
- Woody bottlewasher *(Camissonia boothii)*

Survey Methods

Records Search – A literature search of the California Natural Diversity Database (CNDDB) showed two sensitive wildlife species potentially occurring on Leach Lake. A Mohave ground squirrel was found in the extreme southwestern corner of Leach Lake. The hills in the northeastern portion of the range are considered potential habitat for Nelson's bighorn sheep although the hills are too low in elevation for the species to utilize the site as permanent habitat. Denning Springs, the main source of water in the area, has been dry for a number of years. The area is roadless.

Protocols and Field Results – Field surveys were conducted in October and November. A 100 percent systematic survey following standard desert tortoise protocols (10 meter parallel tracts) were followed for all undisturbed areas. A cursory survey was done on all disturbed areas due to the possible presence of unexploded ordinance. The following proposed targets were surveyed.

Area A – Area A was surveyed on October 23 and consists of locating abandoned vehicles adjacent to the road. The vehicles would be occasionally moved.

Area B –Site B west is located along a wash that is used at the main access road and contains creosote bush scrub vegetation and a rocky soil surface. Site B central is located on the top of a rocky promontory. No access exists to the site. A road goes partially to the site on the bajada then military personnel hike to the observation point. Site B east is located on the lower alluvial fan draining into Leach Lake for the east. The site contains creosote bush scrub and desert wash scrub.

Area C – These two sites are both remote cave sites. The vegetation at both sites is slightly more diverse than the valley floor. A small mammal burrow (coyote or kit fox) was observed in the general area.

Area D – Site D1 is only accessible cross-country. The vegetation at the site was slightly more diverse than the valley floor. Sites D2 and D3 are located east of the lakebed. These sites contain sparse low creosote bush scrub with some allscale and desert wash scrub. The topography was flat and no sites existed for desert tortoise to burrow. This was one of the least diverse habitats. Access to site D4 is cross-country; roads to this site do not exist. The site was surveyed and revealed no evidence of desert tortoise or other sensitive plant or animal species. Site D5 was completely inaccessible by vehicles and was not surveyed—this site will need a biological survey prior to any construction activity. Site D6 is located in the extreme eastern portion of the range. The vegetation was slightly more diverse than the valley floor. A collapsed desert tortoise burrow was observed on this site.

Area E – Site E1 is located on the valley floor and site E2 is located on the alluvial fans from the Quail Mountains. Both sites would be located within the disturbed target arrays. Typical wildlife observed included ants and kangaroo rat and other small rodent burrows. Both sites were surveyed in October when summer annuals were still green.

Area F – Sites F1 and F2 are infantry trenches, both located on alluvial fans from the Granite Mountains. No sensitive plant or animal species were observed.

Area G – This site is large and contains highly disturbed desert wash scrub with creosote bush scrub. The soil surface contains vehicle tracks used by range clean up personnel and craters from ordnance. The foothills above the site (approximately 1 mile south) contain potential desert tortoise habitat. The perimeter of the site was surveyed because it contains the least disturbed habitat.

Area H – This site is large and the center contains the bladed simulated airfield. The perimeter of this site was spot checked in October and surveyed in November. Vegetation included creosote bush scrub and allscale transition. Vegetation was sparse and disturbance was moderate.

Area I – This site is adjacent to, and east of, site H. The surface is heavily disturbed by vehicle tracks and bomb craters. Occasional areas were bladed. The site contains creosote bush scrub vegetation.

Areas J and K – These are two large areas located near the lakebed. The northern portions could not be surveyed due to unexploded ordinance. Area J had heavy surface

disturbance and Area K had a moderate to lightly disturbed surface. Vegetation is creosote bush scrub and desert wash scrub. The vegetation is sparse, short, with lots of bare washes.

Area M – This area is located near Site B east and Site D2. This site is located in creosote bush scrub and desert wash vegetation.

Area N - The site contains creosote bush scrub and desert wash scrub.

4.2.1 Proposed Action

Under the Proposed Action, approximately 216 acres of undisturbed habitat would be graded for target construction. This added to the previously disturbed habitat would total approximately 1,106 acres. The Leach Lake Tactical Range is approximately 144 square miles (24 miles long by 6 miles wide). At 640 acres per square mile, the range contains approximately 92,160 acres. The amount of new habitat that will be graded amounts to approximately 2 tenths of 1 percent. After competing the Proposed Action, the total amount of disturbed habitat (approximately 1,106 acres) would amount to approximately 1.2 percent of the range.

4.2.1.1 Threaten and Endangered Species

Animal Species

Nelson's Bighorn Sheep. The drying of some of the springs in the Avawatz Range within historic times has resulted in a general degradation of bighorn sheep populations at the lower elevations. This project is limited to lower elevations of the Leach Lake Basin so would not impact current bighorn sheep habitat.

Mohave Ground Squirrel. Fort Irwin is at the extreme eastern range of the Mohave ground squirrel; historic records document the presence of the Mohave ground squirrel in the far western portion of the project area. Mohave ground squirrels are usually located in the diverse scrub that occurs in sandy areas. The succulent leaved boxthorn (*Lycium sp*.), summer fruiting saltbush (*Atriplex sp*.), and Joshua tree (*Yucca brevifolia*) provide a food supply when the ground squirrels are active. These plant species are sparse within the study area so potential habitat quality is considered low; therefore, the presence of this species is remote—no Mohave ground squirrels were observed during the biological survey. Fort Irwin resource managers are undergoing conservation efforts to the south of Leach Lake.

To preclude any negative impacts on the species, should they be found in the target construction areas, the biologist present to monitor for the desert tortoise will also be observant for the Mohave ground squirrel. Implementing the Proposed Action should have no new impacts on the Mohave ground squirrel.

Bird Species

Bald and Golden Eagles. Bald or golden eagles are not known to reside, frequent, or nest within the project area; however, they could migrate through the area during migration seasons. Implementing the Proposed Action would have no new impacts on the bald or golden eagles.

Least Bell's Vireo. The breeding population of least Bell's vireo is along the Mojave River well south of the project area. No least Bell's vireos were observed during the biological survey. Implementing the Proposed Action would have no impacts on the least Bell's vireo.

Southwester Willow Flycatcher. The southwestern willow flycatcher breeds in dense riparian habitats along rivers, streams, or other wetlands across the southwestern U.S. The riparian woodland used by willow flycatchers typically is next to, or over, water and has a canopy and understory of shrub and sapling vegetation. No southwestern willow flycatchers were observed during the biological survey. The target areas proposed under this action are not within spring or riparian areas; therefore, implementing the Proposed Action would have no impacts on the southwester willow flycatcher.

Reptile Species

Desert Tortoise. Some evidence of tortoise burrows was observed in the far eastern portion of the study area; however, none of the projects are located in diverse or sensitive habitat (Charlton 2003). Most projects would be located near roads or in undisturbed target areas.

As a dust prevention measure, heavy construction vehicles vehicle speeds will kept below 15 MPH and all other vehicles will be kept below 25 MPH. This measure will also help prevent inadvertent takes of desert tortoise crossing roadways. Implementing the Proposed Action should have no new impacts on the desert tortoise; however, the applicable mitigation measures outlined in the Fort Irwin Biological Opinion (DOI 2004) will be followed, to include:

- A field evaluation of the work sites will be performed to determine whether additional protective measures are to be implemented.
- An evaluation of the level of on-site protection needed for desert tortoise during implementation of the project. Such on-site protection may include full- or part-time monitors or fencing to separate desert tortoise from work areas.
- A project-specific worker education program.
- The USAF must develop a boundary design that allows desert tortoise to exit trenches or prevent them from entering them.
- During the implementation of all projects, the USAF must ensure that its activities are not providing subsidies for predators of the desert tortoise. In particular, the USAF must ensure that the water stops do not provide drinking opportunities for common ravens.

4.2.1.2 Sensitive Species

Bird Species

Burrowing Owl. The burrowing Owl is present throughout the Mojave Desert and the lands encompassing Fort Irwin. It is expected that the burrowing owl would be found on the Leach Lake Tactical Range; however no evidence of burrowing owls were observed in the proposed target construction areas. Most sensitive bird species are located in and

around springs. There are no springs proximal to the proposed target areas; therefore, impacts to the burrowing owl are less than significant. The applicable mitigation measures outlined in the Fort Irwin Biological Opinion (DOI 2004) that will be followed for the desert tortoise (as outlined in paragraph 4.2.1.1 above) would also protect any inadvertent disturbance or taking of burrowing owls that could be nesting in the project areas.

Yellow-Billed Cuckoos. During the breeding season in California, yellow-billed cuckoos are confined to cottonwood-willow riparian habitat. Cuckoos have been observed during the breading season along the Mojave River between Victorville and Barstow. However, there are no confirmed nesting areas within this region of the Mojave Desert. Yellow-billed cuckoos could occur at any desert oasis with willow and cottonwoods, although there are very few records of migrant yellow-billed cuckoos in the vicinity (NTC 2005). No yellow-billed cuckoos were observed during the biological survey. There are no riparian areas within the proposed target construction areas. Construction activities proposed in the Proposed Action will have no negative impacts on the yellow-billed cuckoos.

Other Bird Species. The LeConte's thrasher, loggerhead shrike, long-eared owl, Bell's sage sparrow, Brewer's sparrow, California horned lark, yellow warbler, and prairie falcon primarily use the higher elevations of the Leach Lake Valley and only occasionally use the central portion of the valley. Construction activities proposed in the Proposed Action will have no negative impacts on these bird species.

Feral burro activity reduces habitat quality for birds. Although Two Springs (on the southern boundary of Leach Lake Tactical Range and outside the project area) does not contain an arboreal overstory (primarily willow trees), the other springs do contain trees. Some bird species will remain in areas that contain large trees such as cottonwood (i.e., Leach Springs, also on the southern boundary of Leach Lake Tactical Range outside the project area). Other species, such as warblers, like dense stands of shrubby willow trees to linger in an area. Some species prefer tall grass-like plants such as reeds or cattails to provide cover near the water source. Burros reduce the tree canopy by eating sprouting seedlings and reduce the shrubby trees or grass layers by overgrazing.

Plant Species

Alkali Mariposa Lily. The Alkali Mariposa Lily is found only in riparian areas around springs and other permanent water sources. These sensitive areas are off limits to military construction and training activities; therefore, this plant species would be protected by avoidance (personal conversation with Mickey Quillman 2006). There are no springs or permanent water sources within the proposed target construction areas.

4.2.1.3 Other Biological Resources

Wildlife

Fort Irwin is home to a wide diversity of wildlife species; however, most inhabit the canyons and washes near springs or adjacent creosote bush scrub, riparian woodland, and desert wash vegetation of the northern Granite Range. This relatively wildlife-rich habitat is not indicative of the project area; most of the proposed construction sites are located on dry alluvial fans (Charlton 2004). Construction activities proposed in the Proposed Action will not significantly impact wildlife species.

Migratory Birds and other Raptors

Nellis AFB maintains BASH data for the aircraft operating out of Nellis AFB. Records indicate that approximately 80 percent of reported BASH incidents have no specific location indicated. Most BASH incidents were detected on post-flight aircraft inspections. For those incidents without specific locations indicated, pilots could only verify that the incident occurred sometime after takeoff and before landing. A records search for the past 5 years revealed no BASH incidents within the Leach Lake Tactical Range (personal conversation with Captain Bass 2004). Air operations would not change as a result of the proposed actions; therefore there would be no additional impacts to birds or other raptors.

4.2.1.4 Other Potential Impacts

This project would result in small losses of habitat and degradation of existing disturbed habitat. The amount of undisturbed habitat that would be degraded and bladed for new construction and access roads depends on the amount of proposed projects that occur. Some projects are more destructive because of the project's location in undisturbed areas such as the far eastern portion of Leach Lake.

Most mission activities occur within the bare target areas but off road activities and stray ordnance may land significant distances from the target areas. Wildfires could start when heat caused by the hot metal and explosives ignite remaining vegetation and weedy annuals. Any fires that are ignited by munitions would most likely occur within the target areas.

For those projects located in undisturbed habitat in the eastern portion of the project area, the USAF would have a biological monitor present when construction activities are taking place in accordance with the Fort Irwin Biological Opinion (DOI 2004). All other terms and conditions of the Biological Opinion would also be implemented.

4.2.2 No Action Alternative

4.2.2.1 Threatened and Endangered Species

Animal and Reptile Species

Under the No Action Alternative, activities at Leach Lake would continue as they have historically. Fort Irwin and Nellis AFB would continue target maintenance and range clearances. Fort Irwin would continue to consider Leach Lake as part of its natural resource management area and would continue to include it in general environmental documentation.

Under the No Action Alternative, there would be no new impacts on the Nelson's bighorn sheep and Mohave ground squirrel. Desert tortoise education for all range personnel would continue. Travel would be at speeds below 25 MPH to spot tortoises on the roads, and construction equipment and supplies considered attractive to tortoises (such as empty ended pipes) would be properly stored. There would be no new impacts on the Nelson's bighorn sheep, Mohave ground squirrels, or desert tortoise.

Bird Species

Bald and golden eagles are not known to reside or frequent the project area; however, they could migrate through the area during migration seasons. Implementing the No Action Alternative would have no new impacts on the bald or golden eagles, the least Bell's vireo, or the southwestern willow flycatcher.

4.2.2.2 Sensitive Species

Bird Species

Under the No Action Alternative, activities at Leach Lake would continue as they have historically. There would be no new impacts on the yellow-billed cuckoo, Bell's sage sparrow, Brewer's sparrow, California horned lark, Leconte's thrasher, loggerhead shrike, long-eared owl, prairie falcon, or yellow warbler.

Plant Species

Under the No Action Alternative, activities at Leach Lake would continue as they have historically. There would be no new impacts on the alkali mariposa lily.

4.2.2.3 Other Biological Resources

Wildlife

Under the No Action Alternative, activities at Leach Lake would continue as they have historically. There would be no new impacts on the other wildlife species that live on our adjacent to the Leach Lake Tactical Range.

Migratory Birds and Other Raptors

Nellis AFB maintains BASH data for the aircraft operating out of Nellis AFB. Records indicate that approximately 80 percent of reported BASH incidents have no specific location indicated. Most BASH incidents were detected on post-flight aircraft inspections. For those incidents without specific locations indicated, pilots could only verify that the incident occurred sometime after takeoff and before landing. A records search for the past 5 years revealed no BASH incidents within the Leach Lake Tactical Range (personal conversation with Captain Bass 2004). Air operations would not change as a result of the No Action Alternative; therefore there would be no additional impacts to birds or other raptors.

4.3 Cultural Resources

This section discusses the methods and results for identifying and evaluating cultural resources within the ROI.

Survey Methods

Records Search – A prehistoric and historic record search of the project area was conducted at the San Bernardino County Information Center, San Bernardino County Museum, Redlands, California on 9 April 2004. The search utilized site records, manuscripts, and maps of the California Archaeological Inventory.

Field Methods – On-foot surveys of target areas were conducted on 26-28 April and 13-15 September 2004. Target areas were located by the use of a GPS unit using the Uni-

verse Transverse Mercator (UTM) coordinates provided by the government. Ground visibility was excellent. Transects were walked and spaced approximately 25 meters apart.

Field Survey Results

Area A – Area A is undisturbed. No cultural resources were observed.

Area B – Area B is undisturbed. No cultural resources were observed.

Area C – Area C is undisturbed. No cultural resources were observed at either cave site or along potential "two track" vehicle access trails that would lead from the main road to the cave sites following dried wash beds.

Area D – Area D is undisturbed. Target area D-2 is located on the east side of Leach Lake Playa. One archaeological site was located at the west boundary. The site consists of a light scatter (20+ flakes) of lithic debitage and one biface fragment. Lithic materials are cryptocrystalline silicates and include chalcedony and chert. The west boundary of target D-2 bisects the site. For other Area D targets, no cultural resources were observed.

Area E – Area E is undisturbed. No cultural resources were observed.

Area F – Area F is undisturbed. No cultural resources were observed.

Area G – Area G is undisturbed. No cultural resources were observed.

Area H – Target Area H is a very large, heavily disturbed area.

Area I – Target Area I is a very large, heavily disturbed area.

Area J – Target Area J is a heavily disturbed area.

Area K – Target Area K-1 is an undisturbed area located at the northwest corner of Target Area K-2. No cultural resources were observed. K-2 is a very large, heavily disturbed area. No cultural resources were observed.

Area L – Target Area L is an undisturbed area located on top of a small hill located on the south side of the range. No cultural resources were observed.

Area M – Target Area M is an undisturbed area located on the east of Leach Lake. No cultural resources were observed. The road alignment to the target area runs east/west from an unimproved dirt road located east of the target area. No cultural resources were observed.

Area N – Target Area N is an undisturbed area located on top of the Chocolate Chip hills located due south of Target Area K-2. No cultural resources were observed.

North Boundary Fence – The proposed fence line is in an undisturbed area. No cultural resources were observed.

4.3.1 Proposed Action

A 100% intensive systematic cultural resource survey was completed in all undisturbed areas. Only one cultural resource a small, sparse, surface lithic scatter on the west boundary of target area D2, was located. The scatter was tested for subsurface deposits and no subsurface deposits were located. Nellis AFB determined that the surface site is ineligible for nomination to the NRHP under section 106 of the NHPA. Thus, Nellis AFB made a determination of no adverse effects for the project. Nellis AFB sent a consultation letter requesting concurrence to the California SHPO on January 5, 2006.

4.3.2 No Action Alternative

Under the No Action Alternative, no new target construction would occur. Normal target rebuilding and cleanup activities would continue to occur under current guidelines.

4.4 Earth Resources

Typically, an impact to earth resources would be considered less than significant unless it meets and/or exceeds one or more of the following criteria (NTC 2003a):

- ❖ Disturbs topographical or geological features of unusual scientific study or interpretative value.
- ❖ Triggers or accelerates geological processes that would threaten human life or property.
- ❖ Disturbs the upper dried clay surface crust of dry lakebeds or playas by vehicular or other direct mechanical means that expose these surfaces to wind erosion.

4.4.1 Proposed Action

No adverse impacts to the geology or soil resources are anticipated to occur at targets constructed on disturbed sites. New target construction operations would have no impacts to geology and only minor effects to soil resources. The impacts to soil resources at undisturbed sites would result from blading the area for the first time—these impacts are estimated to be minor as only limited blading would occur. Limited displacement of soil and changes in topography would result as construction of target sites occurs. Wind erosion would be expected to occur on areas where the desert pavement has been broken and/or disturbed; however, the eroded materials (i.e., dust) are expected to remain within the boundaries of the Leach Lake Tactical Range (see paragraph 4.1.1.2).

Water erosion is expected to occur at various degrees on the new targets that are constructed on sloping terrain (e.g., target areas D-1, and C East and West). Slight to no erosion is expected to occur on all other target areas. Due to the low and infrequent annual rainfall in the area, any soil erosion would be less than significant.

4.4.2 No Action alternative

The No Action Alternative would have no new effects on geology or soil resources within the Leach Lake Tactical Range.

4.5 Environmental Justice

In accordance with EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (EO 12898), the USAF is required to identify and address disproportionately high and adverse human health and environmental effects of federal programs, policies, and activities on minority and low-income populations.

4.5.1 Proposed Action

The Leach Lake Tactical range lies within the current NTC withdrawn land. Access to the range is restricted from the public. There are no minority and/or low-income populations within the ROI boundaries. The construction projects proposed under the Proposed Action would remain within the currently established range boundaries; therefore, no new effects involving environmental justice would occur as a result of selecting the Proposed Action.

4.5.2 No Action Alternative

Under the No Action Alternative, there would be no changes to current flying and/or training operations. There would be no adverse impacts to minority and/or low-income populations as a result of selecting the No Action Alternative.

4.6 Hazardous Materials/Waste and Solid Waste

The hazardous materials used on Leach Lake Tactical Range include petroleum, oil, lubricants, paint, batteries, solvents, thinners, antifreeze, and aerosol containers. The use of live and practice ordnance on Leach Lake Tactical Range would generate target debris and munitions residue. The USAF expects to drop an approximately 1.6 million pounds of live ordnance on the Leach Lake Tactical Range over the next 5 years. This represents a 100,000-pound increase over the past 5 years (personal conversation with Captain Taylor 2004).

4.6.1 Proposed Action

The construction projects proposed under the Proposed Action would not introduce any new or different hazardous materials or generate new or different hazardous wastes on Leach Lake Tactical Range. All surplus vehicles and equipment used as targets would be de-fluidized and demilitarized prior to being placed on the range. Vehicle dials and/or instruments that contain low-level radiation would be removed. Other construction materials would be non-polluting/non-toxic. Any hazardous materials/waste and solid waste impacts as a result of selecting the Proposed Action are considered less than significant and would be disposed of as required by Nellis AFB Plan 12, *Hazardous Waste Management*, Nellis AFB *Solid Waste Management Plan*, and Nellis AFB Plan 12, *Waste Sampling and Analysis*.

4.6.2 No Action Alternative

Under No Action Alternative, there would be no changes to current range cleanup and target rebuilding operations.

4.7 Noise

This section discusses the impacts of noise that the proposed action would have on receptors within the ROI. The criteria in this section are any negative, unmitigated impacts caused by noise that rise to the level that would adversely impact human and biological receptors.

4.7.1 Proposed Action

Construction Noise

The noise generated from construction activities is expected to be primarily engine noise from land moving equipment (e.g., road graders, front-end loaders, dump trucks, tractors, etc.). The noise generated from construction activities would be very similar to the noises currently generated from range cleanup and target re-building activities. Construction noises would be of relative short duration (only as long as needed to construct the target) and isolated to the immediate area of each construction site. The construction noise impacts would be barely audible to off-site receptors and onsite workers would be equipped with the appropriate hearing protection as required by OSHA.

Operational Noise

The primary noise receptors within the Leach Lake Tactical Range are those other than human. The range is on withdrawn land and closed to the public. Except for military observers that would be present to conduct tactics training, the range would be closed to flying and training operations when range managers/maintainers are present.

Studies on the effects of noise on wildlife, caused by aircraft overflights and impulse noise such as sonic booms have been focused on birds and hoofed mammals, including raptors and bighorn sheep. It has been shown that occasional, low-altitude overflights can produce increased heart rates in hoofed mammals, but the effect was not found to be detrimental. Birds on the other hand, appear to be unaffected by both low-altitude aircraft overflight noise and sonic booms. Desert tortoises also appear to be unaffected by noise even up to levels over 100 dBA (Parsons 1995). Flying operations under the Proposed Action would not change from those that currently occur.

4.7.2 No Action Alternative

Under the No Action Alternative, there would be no changes to current coronet clean, flying, and/or training operations.

4.8 Safety

This section addresses the impacts on ground, flight, and range safety associated with proposed target construction and operational activities on the Leach Lake Tactical Range. Ground safety includes fire and crash response. Flight safety considers aircraft flight risks such as aircraft accidents and BASH incidents. Range safety assesses the management and use of ordnance associated with range use and cleanup.

4.8.1 Proposed Action

4.8.1.1 Ground Safety

Ground Fires

The Proposed Action would not increase or decrease the potential for ground fires on the Leach Lake Tactical Range. Fire protection provided under the Proposed Action would continue as outlined in paragraph 3.8.2.1.

Crash Response

The Proposed Action would not increase or decrease the potential for crash response activities as a result of aircraft accidents on the Leach Lake Tactical Range. Crash response provided under the Proposed Action, as a result of aircraft accidents on range, would continue as outlined in paragraph 3.8.2.1.

4.8.1.2 Flight Safety

Aircraft Accidents/Mishaps

Under the Proposed Action, aircraft flight operations on the Leach Lake Tactical Range would remain as currently governed by flight rules and standard operating procedures. The effects of an aircraft crash, to include the potential for fire and environmental contamination, would continue to exist.

4.8.1.3 Range Safety

Government contractor personnel employ EOD qualified specialists to ensure range safety for military and contractor personnel. Prior to maintenance or construction work on a target, EOD personnel would ensure the target areas are free of UXO. Contractor personnel are responsible to follow and adhere to USAF safety regulations, instructions, and guidelines, and report safety related accidents/incidents.

Improved range security and public safety would occur due to the construction of a boundary fence on either side of the existing northern range entrance gate and installation of new warning signs along the fence. The fence would extend approximately 500 feet on each side of the gate.

4.8.2 No Action Alternative

4.8.2.1 Ground Safety

Ground Fires

Fire protection provided under the No Action Alternative would continue as outlined in paragraph 3.8.2.1.

Crash Response

Crash response provided under the No Action Alternative, as a result of aircraft accidents on range would continue as outlined in paragraph 3.8.2.1.

4.8.2.2 Flight Safety

Aircraft Accidents/Mishaps

Under the No Action Alternative, aircraft flight operations on the Leach Lake Tactical Range would remain as currently governed by standard flight rules and standard operating procedures. The effects of an aircraft crash, to include the potential for fire and environmental contamination would continue to exist.

Bird-Aircraft Strike Hazards

Under the No Action Alternative, flight activity would be expected to remain as currently constituted.

4.8.2.3 Range Safety

Range cleanup under the No Action Alternative would continue as currently conducted and scheduled.

4.9 Socioeconomics

This section describes the potential impacts on social features and economic resources within the ROI by implementing the proposed action.

4.9.1 Proposed Action

There are no permanent facilities or full-time workers on, or assigned to, the Leach Lake Tactical Range. All workers on the range are active military, government civilians, or government contractors. When performing official duties on the range, workers travel on a daily basis from Nellis AFB, Ft Irwin, or from temporary quarters in nearby towns (primarily Pahrump, Nevada, to the northeast, approximately 90 minutes travel from the range).

4.9.2 No Action Alternative

Impacts would be the same as the Proposed Action.

4.10 Water Resources

4.10.1 Proposed Action

Because the Leach Lake basin is a closed water system in terms of rainfall and storm runoff, waters would remain within the basin and not enter navigable waters of the United States. Any water naturally collected after infrequent thunderstorms accumulate on the dry lakebed and be lost through natural percolation and/or evaporation. There are no springs proximal to the proposed target areas that would be effected by operation under the Proposed Action. The springs in the vicinity of Leach Lake would not be used as a potable water source for human consumption in association with Air Force activities. The Proposed Action would have no negative impacts on water resources.

4.10.2 No Action Alternative

Impacts would be the same as the Proposed Action.

Chapter 5 – Cumulative Impacts

5.1 Definition

The CEQ regulation for implementing NEPA defines cumulative impacts as:

> *". . . the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR §§ 1500-1508)*

Therefore, a cumulative impact analysis is based on a series of assumptions concerning future plans and/or projects and information about their character and timing. Cumulative impacts are examined by combining the effects of the proposed action alternatives with the effects of other past, present, and reasonably foreseeable activities within the ROI.

5.2 Reasonable Foreseeable Future Actions

The NTC at Fort Irwin is currently preparing a *Draft Supplemental Environmental Impact Statement for Proposed Addition of Maneuver Training Land at Fort Irwin, California* (NTC 2003a). This initiative also includes expanding Restricted Area airspace to overlay the proposed expansion of maneuver training land. This initiative includes five action alternatives and a no action alternative—none of the alternatives impact the Leach Lake Tactical Range.

The NTC at Fort Irwin is also preparing a *Draft Programmatic Environmental Impact Statement (PEIS) to implement the NTC Transformation Plan* (NTC 2003b). The PEIS has not yet been released for public review. The purpose of this document is to support and prepare Fort Irwin, the NTC, and the training battlefield at Fort Irwin to effectively train current and future Army combat forces to carry out the Army's national defense mission of creating a force that is dominant across the full spectrum of military operations.

The USAF at Nellis AFB also released an *Environmental Assessment for Changing the Silver Military Operations Area (MOA) for Nellis Air Force Base, Nevada*. The purpose of the proposed action is to reconfigure the Silver MOA to better support U.S. and Allied air and ground forces during advanced Air Warrior combat training conducted at the NTC. The current airspace configuration hampers realistic, high fidelity training. The proposed action would also improve flight safety for military and nonparticipating aircraft.

5.3 Impacts

Section 106 of the *National Historic Preservation Act of 1966* requires that Federal agencies take into account the effects of their undertakings on historic properties. Efforts to identify and evaluate cultural resource properties for this project according to 36 CFR 800.4 are described in a Cultural Resources Report (Moffitt and Moffitt 2005) on file at in the Cultural Resources section of Nellis Air Force Base (99 CES/CEVN). One archaeology site, CA-SBR-11627, a lithic scatter, was located within the Area of Potential

Effect. The site was evaluated as ineligible for nomination to the *National Register of Historic Places* according to 36 CFR 60.4 (d). A determination of *no adverse effect* for the project was submitted to the California State Historic Preservation Office, according to 36 CFR 800.5. The Air Force has completed its consultation responsibilities for the undertaking according to 36 CFR 60.4.

There are no negative direct, indirect, or cumulative impacts on air quality, biological resources, cultural resources, earth resources, environmental justice, hazardous materials/waste-solid waste, noise, safety, socioeconomics, or water resources as a result of implementing the Proposed Action or the No Action Alternative. There are no other past, present, or reasonably foreseeable airspace actions in this geographical area to which this project would add to any cumulative impacts.

Chapter 6 – Other Required Considerations

6.1 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources have on future generations. Irreversible commitments of resources are those resources that cannot be reversed or are lost for an extremely long period of time (e.g., energy and minerals). Irretrievable resource commitments of resources involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., the extinction of a threatened or endangered species, or the disturbance/destruction of a cultural site).

The continuation of activities at Leach Lake Tactical Range as described in the Proposed Action and No Action Alternative would neither irreversibly nor irretrievably commit resources. As in the past, activities that have the potential to produce ground disturbance also have the potential to impact water resources, air quality, biological resources, and cultural resources. However, management policies and practices in place and proposed to continue are designed to minimize potential impacts to these resources.

Construction and maintenance of targets on Leach Lake Tactical Range would require the consumption of limited quantities of aggregate, steel, concrete, petroleum, oil, and lubricants. The commitment of these resources would apply under both the Proposed Action and No Action Alternative.

Chapter 7 – List of Preparers

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Chapter 10 – Glossary of Terms

Above Ground Level (AGL). The altitude expressed in feet measured above the earth's surface.

Above Mean Sea Level (MSL). The altitude expressed in feet above average sea level.

Air Force Instruction (AFI). An AFI is an Air Force directive that sets goals, assigns responsibilities, and provides guidance and procedures to the Air Force , Air National Guard, Air Force Reserves, major commands, and other subordinate activities to meet standards at all Air Force installations.

Air Warrior. The 549th Combat Training Squadron (CTS), in concert with Detachment 2, USAF Air-Ground Operations School (AGOS), based at Fort Irwin, CA, develops, executes, and directs Air Combat Command's Air Warrior exercises. Air Warrior trains USAF ground combat units in the tactical control of airpower in the close battle. U.S. Army brigade commanders and their combat forces deployed to National Training Center receive the support and integrate the airpower presented by the 549 CTS.

Air-to-Ground Training. Air-to-ground training employs all the techniques and maneuvers associate with weapons use and includes low- and high-altitude tactics, navigation, formation flying, target acquisition, and defensive reaction. Training activities include surface attack tactics, different modes of weapons delivery, electronic combat training, and use of defensive countermeasures.

Carbon Monoxide (CO). Carbon monoxide is a common product of incomplete combustion. It is a criteria pollutant with state and federal standards. It is not a primary photochemical reaction compound, but is involved in photochemical reactions. It dissipated rapidly, and is therefore only important on a local scale near sources.

Class A Accident. Any accident incidental to flight, which results in the total cost of damages to government and other property in the amount of $1 million or more; a DoD aircraft is destroyed; or an injury and/or occupational illness results in a fatality or permanent total disability.

Class B Accident. Any accident incidental to flight which results in the total cost of damage in the amount of $200,000 or more, but less than $1 million. An injury and/or occupational illness results in permanent partial disability; or when three or more personnel are hospitalized for inpatient care as a result of a single accident.

Class C Accident. Any accident incident to flight which results in the total cost of property damage is $20,000 or more, but less than $200,000; a nonfatal injury that causes any loss of time from work beyond the day or shift on which it occurred; or a nonfatal occupational illness or disability that causes loss of time from work or disability at any time.

Close Air Support (CAS). CAS consists of air operations against hostile targets in close proximity to friendly forces; further, these operations require detailed integration of each air mission with the fire and movement of those [friendly] forces. CAS provides direct support to help friendly ground forces carry out their assigned tasks. In fluid, high-intensity warfare, the need for tight control, the unpredictability of the tactical situation,

and the proliferation of lethal ground-based air defenses make CAS especially challenging.

Coronet Clean. Coronet Clean is the operational term used to describe range cleanup and target rebuild activities. During Coronet Clean operations, the range is closed to flight training activities. Range EOD contractor personnel make the range safe for cleanup personnel by clearing the target areas of UXO. This is done by detonating the UXO in place. Range contractor personnel then collect and transport all range residue to accumulation sites, where the residue is segregated and processed for disposal and/or recycling. When the target areas are clean of UXO and range residue, range contractor personnel rebuild old targets and/or construct new targets for follow on training.

Exercise. A military maneuver or simulated wartime operation involving planning, preparation, and execution. It is carried out for the purpose of training and evaluation. It may be a combined, joint, or single-service exercise, depending on participating organizations.

Flight Level (FL). Flight level is an aeronautical term for depicting altitude above 18,000 feet above mean sea level. When combined with the number of feet, the last two digits are removed (i.e., 24,000 feet is depicted at FL240). When expressed verbally, each number is pronounced individually (i.e., “flight level, two, four, zero”).

High Accident Potential (HAP). Significant aircraft, missile, space, explosives, miscellaneous air operations, or ground occurrences with a high potential for causing injury, occupational illness, or damage if they recur.

Joint Force. A general term applied to a force composed of significant elements, assigned or attached, of two or more Military Departments, operating under a single joint force commander.

Knot. One knot equals one nautical mile per hour.

Longitude/Latitude. A geographical grid reference system used for referencing positions on the earth. Longitude is the angular distance (measured in degrees and minutes) east or west of the Greenwich meridian. Latitude is the angular distance (measured in degrees and minutes) north or south of the equator.

Maneuver. A maneuver is defined as 1) a movement to place ships or aircraft in a position of advantage over the enemy; 2) a tactical exercise carried out at sea, in the air, on the ground, or on a map in imitation of war; 3) the operation of a ship, aircraft, or vehicle to cause it to perform desired movement; and/or 4) employment of forces on the battlefield through movement of combat forces in relation to the enemy, supported by fire or fires potential from all sources, to gain potential advantage from which to destroy or threaten destruction of the enemy to accomplish the mission.

Military Operations Area (MOA). A MOA is one of the six types of special use airspace. A MOA is airspace designated outside of Class A airspace, to separate or segregate certain non-hazardous military activities from IFR traffic and to identify to VFR traffic where these activities are conducted.

Nautical Mile. A unit of distance used in air navigation. It is the mean distance of one minute of longitude on the equator. One nautical mile is equal to 6,080 feet; it equals approximately 1.15 statute miles.

Nitrogen Oxides (NO_X). Nitrogen oxides are common products of combustion in the presence of nitrogen. It includes nitrogen oxide (NO_2), which is a criteria pollutant with state and federal standards. It is locally and regionally important due to its involvement in the photochemical formation of ozone (O_3).

Ozone (O_3). Ozone is a gas mainly produced by a photochemical reaction between reactive organic gases and oxides of nitrogen in the presence of sunlight (also produced by molecular oxygen in the presence of ultraviolet light or electrical discharge). It is a strong oxidant that is damaging at ground level but necessary at high altitude (in the stratosphere, where it absorbs dangerous ultraviolet light). It is also considered an important greenhouse gas. It is a criteria pollutant with state and federal standards.

Particulate Matter-10 (PM_{10}). Particulate matter with an aerodynamic diameter of less than 10 microns. It is that portion of particulate matter that tends to penetrate into the human lung. It is a criteria pollutant with state and federal standards. It is locally and regionally important.

Restricted Airspace. Restricted airspace is one of the six types of special use airspace. Restricted airspace is established when determined necessary to confine or segregate activities considered hazardous to nonparticipating aircraft.

Sortie. A sortie is a single flight, by one aircraft, from takeoff to landing.

Special Use Airspace. SUA is airspace of defined dimensions wherein activities must be confined because of their nature, or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. The six types of SUA are: Prohibited Areas, Restricted Areas, Military Operations Areas, Warning Areas, Alert Areas, and Controlled Firing Areas.

Volatile Organic Compounds (VOC). Volatile organic compounds are a portion of total organic compounds or gasses (excluding methane, ethane, and acetone due to their low photochemical reactivity). It is regionally important due to its involvement in the photochemical reaction that produces ozone (O_3).

Chapter 11 – Appendices

Appendix A – Intergovernmental and Interagency Coordination for Environmental Planning (IICEP) and Sample Letter

Appendix B – Agency Consultations

Appendix C – Notice of Availability, Comments, and Responses to the Draft EA

Appendix A – Intergovernmental and Interagency Coordination for Environmental Planning (IICEP) and Sample Letter

MAILING LIST

Federal Agencies

United States Fish and Wildlife Service
Ventura Fish and Wildlife Office
2943 Portola Road, Suite B
Ventura CA 93003

Mr. Mickey Quillman
Natural and Cultural Resources
Directorate of Public Works, Environmental Division
Fort Irwin CA 92310-5085

Bureau of Land Management
Barstow Field Office
2601 Barstow Road
Barstow CA 92311

U.S. Army Corps of Engineers, Fort Worth District
Attn: CESWF-CT-C (Mr. Charlie McGregor)
Contracting Division, Room 2A19
819 Taylor Street
Fort Worth TX 76102

California State Agencies

California State Clearinghouse
1400 Tenth Street
P.O. Box 3044
Sacramento CA 95812-3044

California Air Resources Board
1001 "I" Street
P.O. Box 2815
Sacramento CA 95812-2815

California Department of Fish and Game
Eastern Sierra-Inland Desert – Region 6
407 West Line Street
Bishop CA 93514

Mojave Desert Air Quality Management District
Attn: Alan DeSalvio
14306 Park Ave
Victorville CA 92392

Public Libraries

Barstow Public Library
304 East Buena Vista Street
Barstow CA 92311

Baker Community Center
56725 Park Avenue
Baker CA 92309

DEPARTMENT OF THE AIR FORCE
99TH CIVIL ENGINEER SQUADRON (ACC)
NELLIS AIR FORCE BASE, NEVADA

Ms. Eloisa Hopper
99 CES/CEV
4349 Duffer Dr, Ste 1601
Nellis AFB, NV 89191-7007

SAMPLE LETTER

Mr. Mickey Quillman
14997 Indigo Street
Adelanto CA 92301

Dear Mr. Quillman

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) to assess the potential environmental impacts of proposed target upgrades and installation of a security fence and gate at Leach Lake Tactical Range at the National Training Center, Fort Irwin, CA. In support of this process we request your input in identifying general or specific issues or areas of concern that you feel should be addressed in the environmental analysis.

Leach Lake Tactical Range (LLTR) is located approximately 25 miles from Baker, CA in the National Training Center, Fort Irwin, CA. The purpose of the proposed target upgrades is to better support U.S. and allied air and ground forces during advanced combat training. The purpose of the installation of the security fence and gate is to increase public safety by restricting access to the active training range.

Please forward any identified issues or concerns to Ms. Lynn Haarklau at the above address. If you have any questions regarding this proposal, you may contact her at (702) 652-3025 or e-mail at lynn.haarklau@nellis.af.mil. We request that any comments be submitted by 28 April 2006.

ELOISA V. HOPPER, GM-14
Chief, Environmental Management Flight

Attachment
Draft EA

Appendix B – Agency Consultations

United States Fish and Wildlife Service (USFWS)

Forwarded by Robert McMorran/VFWO/R1/FWS/DOI on 05/08/2006 01:49 PM

Robert McMorran/VFWO/R1/FWS/DOI
To <william.garner@itsfed.com>
05/08/2006 10:39 AM
Subject Re: LLTR EA(Document link: Robert McMorran)

Mr. Garner,

The species list you referenced is fine. However, according to the map you sent via email, you could remove the bald eagle, Mohave Tui chub, and Lane Mountain milkvetch.

Let me know if there is anything else I can help with.

Robert
==========
Robert McMorran
U.S. Fish and Wildlife Service
2493 Portola Rd. Suite B
Ventura, CA 93003
Phone: 805.644.1766 ext. 232
Fax: 805.644.3958
Robert_McMorran@fws.gov
==========

"William Garner"<william.garner@itsfed.com>
To robert_mcmorran@fws.gov
04/28/2006 03:38 PM
Subject LLTR EA
Please respond to <william.garner@itsfed.com>

Dear Robert,

As per our telephone conservation, I am requesting our use of your letter, subj: Species for Fort Irwin and the National Training Center, San Bernardino County, California, dated January 12, 2004, sent to me in request of an Environmental Assessment (EA) we were completing on the Silver Military Operations Area (MOA) for Nellis AFB, Nevada. The Silver MOA is over Baker, California, to the east of the National Training Center(NTC), Fort Irwin, California.

I wish to use this same list of "Listed, Proposed, and Candidate Species Which Occur in the Vicinity of the National Training Center and Fort Irwin, San Bernardino County, California" for an EA we recently completed for Nellis AFB covering the Leach Lake Tactical Range. The Leach Lake Tactical Range is a part of the NTC, about 30 miles northwest of Baker, California. As we confirmed on the phone, the species listed in the above letter and list are the same as for Leach Lake. Please respond back with your approval. Thank you for your consideration.

William Garner
ITS Corporation
(702) 523-0269
www.itscorporation.com

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2943 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
PAS#
1002.1106.1467

January 12, 2004

William M. Garner, Project Manager
Charis Professional Services Corporation
310 Abbington Street
Henderson, Nevada 89074-4928

Subject: Species List for Fort Irwin and the National Training Center, San Bernardino County, California

Dear Mr. Garner:

We are responding to your request, dated October 16, 2003, and received in our office on January 8, 2004, for a list of endangered and threatened species that may occur southeast of the vicinity of the National Training Center and Fort Irwin (NTC), San Bernardino County, California. We understand the U.S. Air Force (USAF) is the lead federal agency for this project, and that it would assume responsibility under section 7 of the Endangered Species Act (Act) of 1973, as amended. Nellis Air Force Base (Nellis AFB) has contracted with the Charis Corporation to prepare an Environmental Assessment for an airspace change.

Nellis AFB located in Nevada is initiating a plan to change the boundaries and altitudes of the Silver Military Operations Area (MOA) in southeastern California. This project is being undertaken to better support U.S. and allied air forces during advanced combat training conducted at the National Training Center, Fort Irwin, California.

This response fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Act. The USAF has the responsibility to review its proposed activities and determine whether any listed species may be affected. If the project is a construction project[1] which may require an environmental impact statement, the Army has the responsibility to prepare a biological assessment to make a determination of the effects of the action on the listed species or critical habitat. If the Army determines that a listed species or critical habitat is likely to be adversely affected, it should request, in writing through our office, formal consultation pursuant to section 7 of the Act. Informal consultation may be used to exchange information and resolve conflicts with respect to threatened or endangered species or their critical habitat prior to

[1] "Construction project" means any major Federal action which significantly affects the quality of the human environment designed primarily to result in the building of structures such as dams, buildings, roads, pipelines, and channels. This includes Federal actions such as permits, grants, licenses, or other forms of Federal authorizations or approval which may result in construction.

a written request for formal consultation. During this review process, the Army may engage in planning efforts but may not make any irreversible commitment of resources. Such a commitment could constitute a violation of section 7(d) of the Act.

Federal agencies are required to confer with the Service, pursuant to section 7(a)(4) of the Act, when an agency action is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat (50 CFR 402.10(a)). A request for formal conference must be in writing and should include the same information that would be provided for a request for formal consultation. Conferences can also include discussions between the Service and the Federal agency to identify and resolve potential conflicts between an action and proposed species or proposed critical habitat early in the decision-making process. The Service recommends ways to minimize or avoid adverse effects of the action. These recommendations are advisory because the jeopardy prohibition of section 7(a)(2) of the Act does not apply until the species is listed or the proposed critical habitat is designated. The conference process fulfills the need to inform Federal agencies of possible steps that an agency might take at an early stage to adjust its actions to avoid jeopardizing a proposed species.

The Migratory Bird Treaty Act (16 U.S.C. 703-712) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the Act has no provision for allowing unauthorized take, it must be recognized that some birds may be killed at structures such as communications towers even if all reasonable measures to avoid it are implemented. The Service's Division of Law Enforcement carries out its mission to protect migratory birds not only through investigations and enforcement, but also through fostering relationships with individuals and industries that proactively seek to eliminate their impacts on migratory birds. While it is not possible under the Act to absolve individuals or companies from liability if they follow these recommended guidelines, the Division of Law Enforcement and Department of Justice have used enforcement and prosecutorial discretion in the past regarding individuals or companies who have made good faith efforts to avoid the take of migratory birds.

Candidate species are those species presently under review by the Service for consideration for federal listing. Candidate species should be considered in the planning process because they may become listed or proposed for listing prior to project completion. Preparation of a biological assessment, as described in section 7(c) of the Act, is not required for candidate species. If early evaluation of your project indicates that it is likely to affect a candidate species, you may wish to request technical assistance from this office.

The take of candidate species is not prohibited by the Act, however, we encourage you to consider their conservation in your planning process in the event they are listed prior to project completion. For information on other species of concern that may occur in the project area, the Service recommends that you review information in the California Department of Fish and Game's (CDFG) Natural Diversity Database and that you contact CDFG at (916)324-3812.

If you have any questions regarding this letter, please contact Robert McMorran of my staff at (805) 644-1766.

Sincerely,

Judy Hohman

Judy Hohman
Division Chief
Mojave/Great Basin Desert

Enclosure

LISTED, PROPOSED, AND CANDIDATE SPECIES WHICH MAY OCCUR IN THE VICINITY OF THE NATIONAL TRAINING CENTER AND FORT IRWIN, SAN BERNARDINO COUNTY, CALIFORNIA

BIRDS		
Bald Eagle	*Haliaeetus leucocephalus*	T
Least Bell's Vireo	*Vireo bellii pusillus*	E
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E
Yellow-Billed Cuckoo	*Coccyzus americanus*	C
REPTILES		
Desert Tortoise	*Gopherus agassizii*	T,CH
FISH		
Mojave Tui Chub	Gila bicolor mohavensis	E
PLANTS		
Lane Mountain Milkvetch	*Astragalus jaegerianus*	E

Key:
E - Endangered T - Threatened CH - Critical habitat
C - Candidate species for which the Fish and Wildlife Service has on file sufficient information on the biological vulnerability and threats to support proposals to list as endangered or threatened.

California State Historic Preservation Office (SHPO)

DEPARTMENT OF THE AIR FORCE
99TH CIVIL ENGINEER SQUADRON (ACC)
NELLIS AIR FORCE BASE, NEVADA 89191

Ms. Eloisa V. Hopper
Chief, Environmental Flight
99 CES/CEV
4349 Duffer Drive, Suite 1601
Nellis Air Force Base, NV 89191-7007

5 Jan 2006

Mr. Mike McGuirt
Associate State Archaeologist
Office of Historic Preservation
P.O. Box 942896
Sacramento, CA 94296-0001

Dear Mr. McGuirt

Attached is a Cultural Resources Report by Steven and Linda Moffitt describing inventory for targets to facilitate fighter pilot training on Leach Lake near Ft. Irwin, California. The location has been used for similar training and Nellis Air Force Base, the proponent, proposes to upgrade targets. The Area of Potential Effect is 1400 acres with 1100 acres in areas previously used. A reconnaissance survey was conducted to map the disturbance boundaries. Three hundred acres were subjected to inventory at 15 meter transect intervals.

Archaeological site CA-SBR-11627, lithic scatter, was discovered and recorded. Test excavations indicated a lack of subsurface deposition. Previously recorded lithic scatter site CA-SBR-571, considered to possess potential for eligibility, was relocated. The borders of one target unit were redesigned to ensure avoidance of the site.

I request your concurrence on the ineligibility of site CA-SBR-11127, and also on a *no adverse effect* determination for the targets' upgrade at Leach Lake. If you have questions please contact Mr Keith Myhrer, Nellis Archaeologist, 99 CES/CEVN (702) 652-9365 or E-Mail: keith.myhrer@nellis.af.mil.

Sincerely

Eloisa V. Hopper
ELOISA V. HOPPER
Chief, Environmental Flight

Attachment:
Cultural Resources Inventory Report: Leach Lake Tactical Range

CEVN

STATE OF CALIFORNIA – THE RESOURCES AGENCY ARNOLD SCHWARZENEGGER, *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov
www.ohp.parks.ca.gov

April 12, 2006 In reply refer to: USAF060106A

Eloise V. Hopper
Chief, Environmental Flight
US Department of the Air Force
99th Civil Engineer Squadron (ACC)
4349 Duffer Drive, Suite 1601
Nellis Air Force Base, NV 89191-7007

Re: Inventory of Selected Target Areas of the Leach Lake Tactical Range and Evaluation of Archaeological Site CA-SBR-11627, Fort Irwin, California

Dear Ms. Hopper:

Thank you for your letter of 5 January 2006 requesting my comments with regard to the proposed upgrade targets at the Leach Lake Tactical Range on Nellis Air Force Base, California. Although you do not state it as such in your letter, I am assuming you are consulting with me, in order to comply with Section 106 of the National Historic Preservation Act (NHPA) and implementing regulations codified at 36 CFR § 800. Specifically, you are seeking my concurrence with the finding that the archaeological site CA-SBR-11627 is not eligible for inclusion in the National Register of Historic Places (NRHP) and that the undertaking will not affect historic properties.

The proposed action would include reconfiguring old targets and building new targets to enhance training for Air Force personnel and selected members of the Army, Navy, and Marine Corps. The Air Force identified one archaeological site (CA-SBR-11627) within the project area of potential effect (APE). Test excavations, documented in the report *An Archaeological Inventory of Selected Target Areas of the Leach Lake Tactical Range and Evaluation of Archaeological Site CA-SBR-11627, Fort Irwin* (December 2005) included with your letter, indicated that the site lacks subsurface deposition. Because the site has not yielded, nor is likely to yield important information, the Air Force has determined that CA-SBR-11627 is not eligible for inclusion in the NRHP. Based on a review of the submitted documentation, I concur with this determination.

The APE also includes archaeological site CA-SBR-571, a property that is considered eligible for inclusion in the NRHP, however the target area was redesigned to ensure that the site will be avoided. Consequently, the Air Force has determined that the undertaking will result in no adverse effects on historic properties. Based on my review of your submittal, I believe that a finding of No Historic Properties Affected, per 36 CFR § 800.4(d)(1), would be the appropriate finding for this undertaking. I am assuming that if you do not respond in within 15 days from the receipt of this letter that you agree with the determination I have proposed.

Thank you for seeking my comments and considering historic properties as part of your project planning. If you have any questions or concerns, please contact David Byrd, Project Review Unit historian, at (916) 653-9019 or at dbyrd@ca.parks.gov.

Sincerely,

Stephen D. Mikesell for

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer

MWD:db

California Department of Fish and Game (CDFG)

-----Original Message-----
From: Becky Jones [mailto:dfgpalm@mindspring.com]
Sent: Wednesday, May 10, 2006 2:36 PM
To: william.garner@itsfed.com
Subject: Re: LLTR EA

Hi William,

The following is correct, with the addition of the burrowing owl.

Becky Jones
CDFG

William Garner wrote:

> Dear Rebecca,
>
> As per our telephone conservation, I am requesting our use of your letter, subj: *Nellis AFB, Silver Military Operations Area,* dated December 12, 2003, sent to me in request for an Environmental Assessment (EA) we were completing on the Silver Military Operations Area (MOA) for Nellis AFB, Nevada. The Silver MOA is over Baker, California, to the east of the National Training Center (NTC), Fort Irwin, California.
>
> I wish to use this same list of California listed threatened, endangered, and sensitive species for an EA we are completing for Nellis AFB covering the Leach Lake Tactical Range. The Leach Lake Tactical Range is a part of the NTC, about 30 miles northwest of Baker, California. As we confirmed on the phone, the species listed in the above letter and list are the same as for Leach Lake with the exception of the burrowing owl—as directed, we will add the burrowing owl to the list. Please respond back with your approval. Thank you for your consideration.
>
> William Garner
> ITS Corporation
> (702) 523-0269
> www.itscorporation.com

STATE OF CALIFORNIA--THE RESOURCES AGENCY Arnold Schwarzenegger, Governor
DEPARTMENT OF FISH AND GAME
Eastern Sierra-Inland Deserts – Region 6
Bishop Field Office
Habitat Conservation Program
407 West Line Street
Bishop, California 93514
(760) 872-1171

December 12, 2003

Mr. William M. Garner
Charis Professional Services Corporation
310 Abbinton Street
Henderson, NV 89074

Re: **Nellis AFB, Silver Military Operations Area**

Dear Mr. Kilpatrick:

The California Department of Fish and Game (Department) has reviewed the information submitted for the above mentioned project and your request for California listed threatened, endangered, sensitive species that could be affected. Following is a list of species that may occur with in the area designated by you map.

Desert Tortoise – State Threatened
Bighorn sheep – State Full Protected
Hepatic Tanager – Species of Special Concern (SSC)
LeConte's Thrasher – SSC
Mojave Fringe-toed Lizard – SSC
Southwestern Pond Turtle – SSC
Yellow-breasted Chat – SSC
Yellow Warbler – SSC
Numerous Raptors – protected under CA Fish and Game Code Section 3503.5

Thank you for this opportunity to comment. If you have any questions regarding this letter please contact me at (661) 285-5867.

Sincerely,

Rebecca Jones, Environmental Scientist
Habitat Conservation Planning Branch

Appendix C – Notice of Availability, Comments, and Responses to the Draft EA

The Desert Dispatch, Barstow CA

Noteworthy events in the Barstow area

tion, call Patt Rees at 252-2830 or the museum at 256-5452.

Mojave River Valley Museum to hold monthly meeting

BARSTOW — Linda Slater will be presenting a "Tour of Cultural Sites in the Mojave National Preserve" on Wednesday at 7:30 p.m. Linda is a park ranger in education and outreach at the Mojave National Preserve. She works on exhibit planning, is the editor of the park newspaper, maintains the park website, and presents education programs at the Desert Discovery Center.

For more information, call 256-5452.

Chile cook-off and Salsa/Cumbia Festival

BARSTOW — The Barstow Hispanic Chamber of Commerce in conjunction with 95.9 El Portal will present its annual New Mexico Chile cook-off and Salsa/Cumbia Festival on April 8 at Dana Park from noon to 6 p.m. Participants are needed and can win cash prizes for the best New Mexico Chile.

Also vendors and non-profit civic groups interested in showcasing their goods or products should contact Jeanett at 256-2121 or 241-4759. Space is limited.

Summers, membership coordinator, at 909-228-8323 or check the website at www.mainstreetmurals.

a.m. Wood carving classes.

Friends of the Library

Book sale, 50 cents for hard backs and 25 cents for paper

Church

Praise Tuesday. Praise singing at 6:30 p.m. 1301 E. Mt. View. 256-1624.

Nellis Air Force Base Invites Public Comments on the Draft Environmental Assessment for Target Upgrades on Leach Lake Tactical Range at the National Training Center, Fort Irwin, CA

Nellis Air Force Base (AFB) announces the availability of a draft Environmental Assessment (EA) to reconfigure and/or rebuild current targets and build new targets on Leach Lake Tactical Range at the National Training Center (NTC), Fort Irwin, California. The Air Force proposes to reconfigure, rebuild, and/or build new targets on Leach Lake Tactical Range to enhance realistic training for air liaison officers, forward air controllers-airborne, tactical air control parties, special tactics team members, and selected Army, Navy, and Marine Corps members. The Leach Lake Tactical Range is a part of the NTC.

You may view the draft EA and draft Finding of No Significant Impact (FONSI) at www.nellis.af.mil/pa or request a copy from the address below. Copies are also available for review at the Barstow Public Library, 204 East Buena Vista Street, Barstow CA, and the Baker Community Center, 56725 Park Avenue, Baker CA. Please provide any comments on the draft EA by April 28, 2006 to:

Mr. Mike Estrada
99th Air Base Wing/Office of Public Affairs (99ABW/PA)
4430 Grissom Ave., Suite 107, Nellis AFB, NV 89191
For general information, contact Mr. Estrada at: (702) 652-2750

DAILY PRESS

PRESENTS YOU! BE THE JUDGE

BY ELISSA BERNSTEIN

You! be the Judge

How Could You Drug Your Baby?

Josie cruised the streets in her six-inch heels and a fake fur coat. She tried to tempt the male drivers.

Craig approached her. He had noticed her before.

"Hey gorgeous! How about a little action tonight?" Josie grinned.

Craig had something else in mind.

"Actually, I was wondering if you'd like to talk..."

"This isn't a chatroom," Josie barked. "I'm working."

Somehow, Craig convinced her to join her at the neighborhood diner.

They talked for hours.

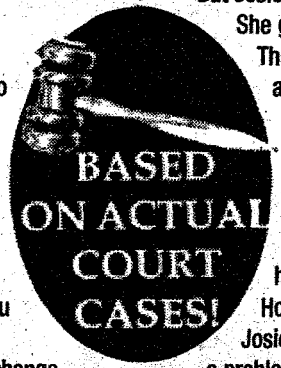
Craig looked into Josie's eyes. "Can't you do something else with your life?"

Josie stormed to her feet. "Don't try to change me. Heroine and hooking are my life."

Craig chased after her. "I know you can kick the drugs. Let me help."

"Why would you want a loser like me?" Josie turned to him, in tears.

They fell in love and moved in together. Josie got a



A month later, Josie had some wonderful news. "I'm pregnant."

Craig was thrilled.

But Josie couldn't beat the heroin.

She gave birth to a sick little boy.

The doctor scowled. "Your baby is drug addicted. I'm calling social services."

Josie was charged with child abuse.

THE COURTROOM

The prosecutor argued firmly. "Josie took heroin, knowing she'd be harming her baby. We should have no pity for her. Hold her accountable."

Josie was beside herself. "I know that I have a problem. I tried so many times to stop, but I simply can't. I never meant to harm my child, but my addiction is stronger then me. Please help!"

Is Josie guilty of child abuse? You! Be The Judge.

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse and Planning Unit

Arnold
Schwarzenegger
Governor

Sean Walsh
Director

Memorandum

Date: April 7, 2006

To: All Reviewing Agencies

From: Scott Morgan, Senior Planner

Re: SCH # 2006044001

Target Upgrades on Leach Lake Tactical Range at the National Training Center, Fort Irwin, California

The State Clearinghouse sent you the Notice of Completion for the above-referenced project on April 3, 2006 but we did not provide a copy of the Negative Declaration. Please accept the attached Neg Dec with the Notice of Completion attached. We apologize for any inconvenience this may have caused.

cc: Lynn Haarklau
U.S. Air Force, Nellis AFB
4349 Duffer Drive, Suite 1601
Nellis AFB, NV 89191-7007

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P. O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH # 2006044001

Project Title: Target Upgrades on Leach Lake Tactical Range at the National Training Center, Fort Irwin, California
Lead Agency: U.S. Air Force, Nellis AFB — **Contact Person:** Ms Lynn Haarklau
Mailing Address: 4349 Duffer Drive, Suite 1601 — **Phone:** (702) 652-3025
City: Nellis AFB, NV — **Zip:** 89191-7007 — **County:** Clark

Project Location:
County: San Bernardino — **City/Nearest Community:** Baker, CA
Cross Streets: N/A — **Zip Code:** 92310
Assessor's Parcel No.: N/A — **Section:** — **Twp.:** 17N & 18N **Range:** 2E & 3E **Base:** San Bernardino
Within 2 Miles: State Hwy #: N/A — **Waterways:** N/A
Airports: N/A — **Railways:** N/A — **Schools:** N/A

RECEIVED
MAR 30 2006
after 12pm
STATE CLEARING HOUSE

Document Type:
CEQA: ☐ NOP ☐ Draft EIR ☐ Early Cons ☐ Supplement/Subsequent EIR ☐ Neg Dec (Prior SCH No.) ☐ Mit Neg Dec ☐ Other
NEPA: ☐ NOI ☒ EA ☐ Draft EIS ☒ FONSI
☐ Joint Document ☐ Final Document ☐ Other

Local Action Type:
☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan
☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan
☐ Rezone ☐ Prezone ☐ Use Permit ☐ Land Division (Subdivision, etc.)
☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☒ Other DoD action

Development Type:
☐ Residential: Units ____ Acres ____
☐ Office: Sq.ft. ____ Acres ____ Employees ____
☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
☐ Industrial: Sq.ft. ____ Acres ____ Employees ____
☐ Educational
☐ Recreational
Total Acres (approx.) ____
☐ Water Facilities: Type ____ ____ MGD
☐ Transportation: Type ____
☐ Mining: Mineral ____
☐ Power: Type ____ ____ MW
☐ Waste Treatment: Type ____ ____ MGD
☐ Hazardous Waste: Type ____
☒ Other: Military Target Upgrade

Project Issues Discussed in Document:
☐ Aesthetic/Visual
☐ Agricultural Land
☒ Air Quality
☒ Archeological/Historical
☒ Biological Resources
☐ Coastal Zone
☒ Drainage/Absorption
☐ Economic/Jobs
☐ Fiscal
☐ Flood Plain/Flooding
☒ Forest Land/Fire Hazard
☒ Geologic/Seismic
☐ Minerals
☒ Noise
☐ Population/Housing Balance
☐ Public Services/Facilities
☐ Recreation/Parks
☐ Schools/Universities
☐ Septic Systems
☐ Sewer Capacity
☒ Soil Erosion/Compaction/Grading
☒ Solid Waste
☒ Toxic/Hazardous
☐ Traffic/Circulation
☒ Vegetation
☒ Water Quality
☐ Water Supply/Groundwater
☐ Wetland/Riparian
☒ Wildlife
☐ Growth Inducing
☒ Land Use
☒ Cumulative Effects
☐ Other

Present Land Use/Zoning/General Plan Designation:
Military Reservation

Project Description: *(please use a separate page if necessary)*
The USAF at Nellis AFB, Nevada proposes to upgrade targets on Leach Lake Tactical Range to enhance realistic training for air liaison officers, forward air controllers-airborne, tactical air control parties, special tactics team members, and selected Army, Navy and Marine Corps members. The realistic training includes tactics, techniques, and procedures in planning, requesting, coordinating, and controlling close air support at the tactical level. Upgrade actions would include reconfiguring and/or rebuilding current targets and building new targets. The USAF also proposes to construct a 500-foot long fence on each side of the existing Owl Springs fence and gate, and install installation boundary/warning signs to improve security and public safety.

State Clearinghouse Contact: (916) 445-0613 sr
State Review Began: 4 - 3 - 2006
SCH COMPLIANCE 5 - 2 - 2006

Please note State Clearinghouse Number (SCH#) on all Comments
SCH#: 2006044001
Please forward late comments directly to the Lead Agency

AQMD/APCD 33/26
(Resources: 4 / 8)

Project Sent to the following State Agencies

- X Resources
- ____ Boating & Waterways
- ____ Coastal Comm
- ____ Colorado Rvr Bd
- X Conservation
- X Fish & Game # 6
- ____ Delta Protection Comm
- ____ Forestry & Fire Prot
- X Historic Preservation
- X Parks & Rec
- ____ Reclamation Board
- ____ Bay Cons & Dev Comm
- X DWR
- X OES (Emergency Svcs)

Bus Transp Hous
- ____ Aeronautics
- X CHP
- X Caltrans # 9
- ____ Trans Planning
- ____ Housing & Com Dev
- ____ Food & Agriculture
- ____ Health Services

State/Consumer Svcs
- ____ General Services

Cal EPA
- ____ ARB – Airport Projects
- ____ ARB – Transportation Projects
- ____ ARB – Major Industrial Projects
- X Integrated Waste Mgmt Bd
- ____ SWRCB: Clean Wtr Prog
- ____ SWRCB: Wtr Quality
- ____ SWRCB: Wtr Rights
- X Reg. WQCB # 6V
- X Toxic Sub Ctrl-CTC

Yth/Adlt Corrections
- ____ Corrections

Independent Comm
- ____ Energy Commission
- X NAHC
- ____ Public Utilities Comm
- ____ State Lands Comm
- ____ Tahoe Rgl Plan Agency

____ Conservancy

____ Other: ____

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse and Planning Unit

Arnold Schwarzenegger
Governor

Sean Walsh
Director

May 3, 2006

Lynn Haarklau
U.S. Air Force
4349 Duffer Drive, Suite 1601
Nellis AFB, NV 89191-7007

Subject: Target Upgrades on Leach Lake Tactical Range at the National Training Center, Fort Irwin, California
SCH#: 2006044001

Dear Lynn Haarklau:

The State Clearinghouse submitted the above named Joint Document to selected state agencies for review. The review period closed on May 2, 2006, and no state agencies submitted comments by that date. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

Please call the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process. If you have a question about the above-named project, please refer to the ten-digit State Clearinghouse number when contacting this office.

Sincerely,

Terry Roberts

Terry Roberts
Director, State Clearinghouse

Document Details Report
State Clearinghouse Data Base

SCH# 2006044001
Project Title Target Upgrades on Leach Lake Tactical Range at the National Training Center, Fort Irwin, California
Lead Agency U.S. Air Force

Type JD Joint Document

Description The USAF at Nellis AFB, Nevada proposes to upgrade targets on Leach Lake Tactical Range to enhance realistic training for air liason officers, forward air controllers-airborne, tacital air control parties, special tactics team members, and selected Army, Navy, and Marine Corp members. The realistic training includes tactics, techniques, and procedures in planning, requesting, controlling close air support at the tactical level. Upgrade actions would include reconfiguring and/or rebuilding current targets and building new targets. The USAF also proposes to construct a 500-foot long fence on each side of the existing Owl Springs fence and gate, and install installation boundary/warning sights to improve security and public safety.

Lead Agency Contact

Name Lynn Haarklau
Agency U.S. Air Force
Phone (702) 652-3025 **Fax**
email
Address 4349 Duffer Drive, Suite 1601
City Nellis AFB **State** NV **Zip** 89191-7007

Project Location

County San Bernardino
City
Region
Cross Streets
Parcel No.
Township 17,18N **Range** 2,3E **Section** **Base** SBBM

Proximity to:

Highways
Airports
Railways
Waterways
Schools
Land Use Military Reservation

Project Issues Air Quality; Archaeologic-Historic; Biological Resources; Drainage/Absorption; Forest Land/Fire Hazard; Geologic/Seismic; Noise; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Vegetation; Water Quality; Wildlife; Landuse; Cumulative Effects

Reviewing Agencies Resources Agency; Department of Conservation; Department of Fish and Game, Region 6; Office of Historic Preservation; Department of Parks and Recreation; Department of Water Resources; Office of Emergency Services; California Highway Patrol; Caltrans, District 9; Integrated Waste Management Board; Regional Water Quality Control Bd., Region 6 (Victorville); Department of Toxic Substances Control; Native American Heritage Commission

Date Received 04/03/2006 **Start of Review** 04/03/2006 **End of Review** 05/02/2006

Note: Blanks in data fields result from insufficient information provided by lead agency.

State of California - The Resources Agency ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF FISH AND GAME

http://www.dfg.ca.gov
Habitat Conservation Planning
Eastern Sierra/Inland Deserts Region
407 W. Line Street
Bishop, CA 93514
(760) 872-1171
(760) 872-1284 - FAX

May 12, 2006

Ms. Lynn Haarklau
U.S. Air Force, Nellis AFB
4349 Duffer Drive, Suite 1601
Nellis AFB, NV 89191-7007

Subject: Target Upgrades on Leach Lake Tactical Range at the National Training Center, Fort Irwin, California

Dear Ms. Haarklau:

The Department of Fish and Game (Department) has reviewed the Draft Environmental Assessment (EA) for the Updating Targets on Leach Lake Tactical Range at the National Training Center, Fort Irwin, California, SCH# 2006044001. The proposal includes the implementation of some or all of the proposed target upgrade construction projects programmed on the Leach Lake Tactics Range as schedule and budget constraints allow. There are fourteen areas mentioned and upgrades can range from construction of an observation point, to building a simulated industrial/military complex. Some of the areas have been previously disturbed; others have not. The project is located on the northern portion of Fort Irwin, San Bernardino County.

The Department is responding as a Trustee Agency for fish and wildlife resources (Fish and Game Code sections 711.7 and 1802 and CEQA Guidelines section 15386) and a Responsible Agency regarding any discretionary actions (CEQA Guidelines section 15381) required by the Department.

In Table ES-1: Summary of Alternatives, the document states that to avoid impacts to threatened and endangered species the United States Air Force (USAF) will have a biological monitor present when construction activities take place. This section should describe what actions the monitor will take if a listed species is found on the site. There appears to be no additional mention of mitigation measures for any of the possible impacts from the project in the remainder of the document.

Chapter 3.2 discusses biological resources. There is no complete list of plants or animals which were observed on site. For most of the listed or sensitive species the EA states that they were not observed during the biological survey. The document does not disclose when the survey was completed. If the survey was not conducted at the appropriate time of year when flowering plants are visible and identifiable, the results are likely invalid. Many species may be

missed if surveys are conducted during inappropriate times of year. In addition, survey protocols should be followed. The document should disclose the survey methodology that was used, in order for reviewers to determine if appropriate protocols were used. A copy of the survey results should be included in the document.

Burrowing owl is known from other locations at Fort Irwin. Burrowing owl is a California Species of Special Concern, and individual owls and their burrows are also protected under Fish and Game Code Section 3503.5. This species was not discussed in the document. The document should discuss whether the species is present, and the amount of habitat which will be significantly impacted. Impacts to habitat must be mitigated with replacement habitat. Individual owls and their burrows may not be taken at any time. If individual owls will be impacted, the Department should be contacted to determine the most appropriate action.

There is no mention of how much habitat will be lost for species use. In Chapter 4, Section 4.1 – Air Quality it says that 216.1 acres will be graded. It was previously mentioned in the document that some of the area was disturbed and some was undisturbed. The amount of area with vegetation on it,that will be impacted should be listed in Section 4.2.

In closing, the additional information mentioned above should be included in the revised document. Thank you for this opportunity to comment. Questions regarding this letter and further coordination on these issues should be directed to Ms. Rebecca Jones, Environmental Scientist, at (661) 285-5867.

Sincerely,

Denyse Racine
Senior Environmental Scientist

cc: Ms. Rebecca Jones, CDFG
Mr. Ray Bransfield, USFWS
State Clearinghouse
Chron

Nellis AFB has made the changes to the document requested by the California Department of Fish and Game.

From: Quillman, Mickey Mr DPW [mailto:mickey.quillman@irwin.army.mil]
Sent: Thursday, April 27, 2006 2:08 PM
To: Haarklau Lynn E GS-11 99 CES/CEVN
Subject: EA for Target Upgrades on Leach Lake Tactical Range at the National Training Center, Fort Irwin, CA

Ms. Haarklau:

I have reviewed the EA for the modification of the Leach Lake Gunnery Range, and have no comments on the document.

VR
Mickey Quillman
Natural and Cultural Resources
Directorate of Public Works, Envrionmental Division
Fort Irwin, CA 92310-5085
Phone (760) 380-3740
FAX (760) 380-2677